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Wheelhorse *of the* machine shop

Many modern materials that go through the shop put tool steel on the spot. They call for a super cutting steel to keep production from bogging down. Bethlehem Special High Speed Tool Steel has what it takes to hold a cutting edge when the going is heavy.

Back of Bethlehem Special High Speed Tool Steel are more than thirty-five years of experience in tool steel manufacture accompanied by unceasing research to improve the efficiency of cutting steels. Today, Bethlehem Special has an exceptional combination of the characteristics needed to stand up to tough jobs. Time out for grinding is kept at a minimum, even when working at high speeds and temperatures, taking deep, heavy cuts in hard-to-machine materials.

That's why experienced shopmen so often call for Bethlehem Special when they're handling high-test iron castings, special steels and similar stubborn materials.

Other Bethlehem Tool Steels are equally efficient and equally well adapted to service in their particular fields of application.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

...THE IRON AGE...

JANUARY 14, 1937

ESTABLISHED 1855 Vol 139, No. 2

More Symbols, Less Formulas

IN the opinion of this humble observer of events, the big problem of today and tomorrow is plainly outlined. It is this: We must bring the personal touch back into industry.

When I started my industrial apprenticeship, some 30 years ago, industrial relations and industrial management were much simpler than they are today. We did not have employment managers in those days, nor personnel relations departments. We had mechanization of industry, it is true, but we did not have mechanization of human relations. The boss did not need the aid of pink, green and yellow efficiency rating cards to know whether or not a man did his work well and was entitled to advancement. Nor did he need the opinion of a psychiatrist or a psychoanalyst to determine whether or not a man should be put to work or changed from one machine to another.

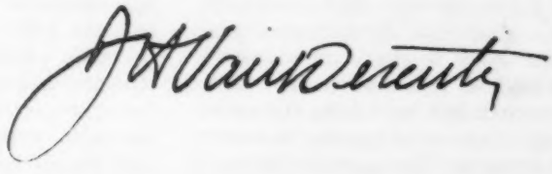
Of course, industrial plants were much smaller then than now, but I question very much if human nature has changed in proportion. A large part of our trouble, perhaps, is that our industrial plants have outgrown human nature. This current cry against mechanization may not be so much a protest against the machine as it is against the mechanization of human relations.

Undoubtedly there exists a "science" of management. There also exists an "art" of management. Today, in my opinion, the need is not so much for more science as for more art.

Elements are content when you reduce them to a formula, but human nature is not. That is the big stumbling block that "scientific management" of departed days bumped against.

We need more "symbols" in industry and less formulas, in the realm of the employer-employee relations. It is true that formulas are composed of symbols, but symbols are greater than formulas. The King of England is a symbol that holds together the people, high and low, of a great and diversified empire, but his power does not depend upon a formula.

Maybe if we were to take more pains to provide our industries with personalized symbols and less pains to construct and apply impersonal formulas in the field of human relations, we might develop a better understanding. At any rate, it is something to think about.



"EX APPEAL" *in* MACHINE TOOL SELLING

By E. P. BLANCHARD
Sales Manager, Bullard Co.

MODERN merchandising may be said to crystallize and capitalize a variety of psychological appeals, selected and directed to specific audiences.

Thus it is that we have the "eye appeal" of modern design and packaging of consumer products, the "sex appeal" of perfumes, hosiery and motion pictures and a variety of other appeals, all expressed in current advertising.

This article tells of the development of a "modern" appeal to influential buyers of machine tools. It is the "ex appeal". The story of the development of this important approach to the executive buyer of capital goods is told by one to whom it is by no means new, and who was, with his associates, a pioneer in developing it.

DURING the past year there has been much emphasis placed on the selling of machine tools to the chief executive instead of to the shop man. The approach has been from the profit angle instead of on the stressing of features. This plan of approach seems to be taken as a new development. It is quite possible that to many it is new, although this is doubtful. Any really successful machine tool salesman, when questioned regarding his selling methods will, without hesitation, say that he has used the profit method of selling for many years and always attempts to reach as high up in the executive ranks as possible.

It may be that what the machine tool salesman has known and practiced for many years is just now being noted by the executives of his company. However, it is probable that this is not the case but that the executive personnel has in the past had no need to consider the matter of sales approach, because there has always been an ever expanding market for their product.

The machine tool market can be divided into three distinct and separate groups; the expansion market, which is purely the adding of machines of the same type when added production facilities are needed; the new industries market, where entirely new organizations and plants are created to manufacture a new product, and the re-

placement market, which can be divided between the replacement of like machines and replacement with new methods.

Up until the time of the last depression the expansion and new industry markets had been dominant and had probably been responsible for 80 to 90 per cent of the machine tool industry's volume. Because of the amount of these purchases there was no reason to approach management to induce it to spend money for replacement. Management had already made available sufficient funds for the purchase of equipment to increase its production facilities, and hence the builder's problem was to obtain in direct competition the largest possible portion of this business. His contacts were all with the production executives who were spending these funds, and his advertising was directed to these same individuals. We are all inclined to take the line of least resistance and, for that matter, it is good business to sell to those markets that are cheapest and easiest to reach. Therefore, the attitude of the builders in the period prior to the depression was quite in keeping with the times.

Replacement Market Now Dominant

The two dominant markets of this period before the depression are now practically gone and there is no indication at the present time of how soon we can again sell with so little effort. With the fixities and rigidities that are being created by the Government in the corporation tax of 1936, the Patman Bill and several others, it is quite possible that machine tool manufacturers must look to the replacement market for the major share of their business for some time to come.

This market will require the use of what is termed the "new approach," if it is to be successfully developed. Before sales can be made, not only must production men be acquainted with the profitability of the new equipment over the old, but also must chief executives be sold on the fact that the new equipment will assist in protecting their profits. It will probably be necessary to change the views of many regarding the purchasing of replacement machinery.

In the past it has been the policy of many firms to quickly replace

E. P. BLANCHARD

equipment that will pay for itself in one year, others in two years and a few in three years. Most executives, however, have been very reluctant to listen to any proposition where a lesser saving is shown, except where it has been necessary to purchase a machine because the old one was completely worn out. This attitude must be changed if plants are to be kept up to date and their investment protected. Many intangible savings other than the direct return are possible, and industry must be made conscious of them.

Experience With Executive Approach

This may be done in many ways. More direct contacts with chief executives may be made. Action through the trade association can be taken by that body's giving out information for magazine and trade paper editorials, and newspaper items. Probably the most effective way is through advertising by the individual companies in executive papers. It is likely that all three methods should be used and, if so, quicker results might be obtained.

Some companies in the machine tool industry were forced into the new approach as far back as 1923. Bullard happened to be one of those few, and the record of our sales has convinced us as to the success of this method.

With our line of Mult-au-matics and Contin-u-matics representing a considerable investment and being introduced after other methods of mass production were installed, we found the need of reaching chief executives that could authorize large expenditures. Hence, much of the selling of these products in the early '20's was carried on by our chief executives. Because of their other duties, it was not possible for them to spend as much time contacting as was thought necessary, and advertising was considered as a supplement to their efforts. The usual trade papers for advertising machine tools did not reach those to whom we wished to tell our story, and direct mail was cast aside because it probably would not pass the executive's secretary. Thus, we were obliged to consider publications that had not been previously used in machine tool advertising.

Attempts to Reach Chief Executives

Our first attempts to reach the chief executives through advertising were made in 1923 in THE IRON AGE. Our reason for choosing IRON AGE was that it was one of the few mechanical trade papers read by executives and also by the higher production officials. These production officials also read the usual shop trade papers with feature ads, but our advertisement in IRON AGE gave a different approach, that which was purely from the profit angle.

The response from this type of approach was so gratifying that we increased our number of pages from 8 in '23 to 14 in '24 and to 52 in '25, and in all these advertisements we carried the same theme of "profits on the investment."

Soon after our first advertisement of the Mult-au-matic and Contin-u-matic appeared and we felt the pull of this type of copy, we decided to try the same approach through the same trade paper with our boring mills and vertical turret lathes. These machines are normally considered everyday tools of industry that are purchased as needed by mechanical men. We had sold them on that

basis quite successfully for many years. We combated competition in the usual manner of feature against feature and considered we were getting our share of the business. Although we were somewhat skeptical of the benefits to be obtained by advertising these machines to higher executives from the profit standpoint, we were more than satisfied with the results and at once decided to carry this form of advertising further.

For 1924 we worked up a very complete campaign to reach the executive. Our introductory advertisement is reproduced in Fig. 1.

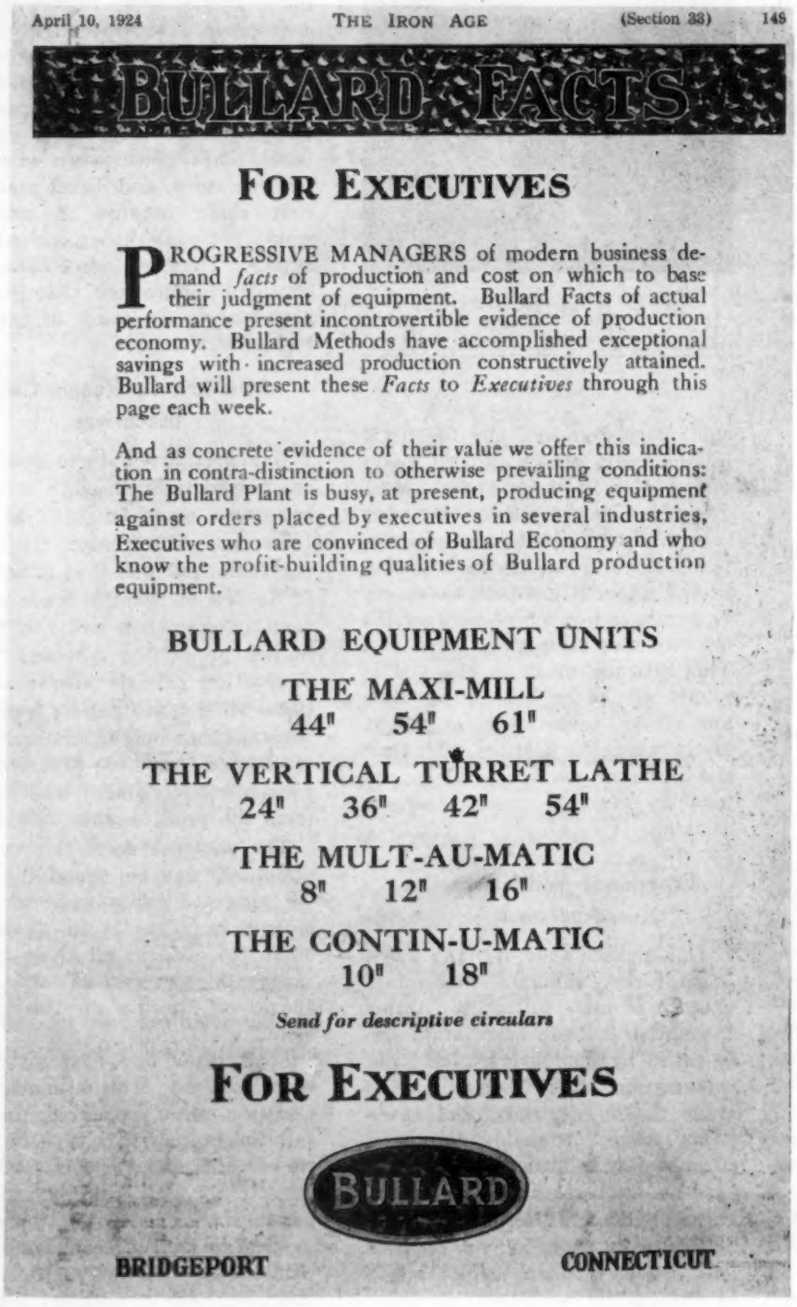
Further on in the series one of our advertisements for Mult-au-matics, emphasizing the executive appeal, was as shown in Fig. 2.

Below the copy, we had an artist's conception of the three Mult-au-matics producing this profit.

In this series, we covered the V.T.L. and Contin-u-matics as well —always stressing profits with no mention of machine details.

Railroad Executives

After the results of our 1924 campaign in IRON AGE had been



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BULLARD FACTS

FOR EXECUTIVES

PROGRESSIVE MANAGERS of modern business demand *facts* of production and cost on which to base their judgment of equipment. Bullard Facts of actual performance present incontrovertible evidence of production economy. Bullard Methods have accomplished exceptional savings with increased production constructively attained. Bullard will present these *Facts* to *Executives* through this page each week.

And as concrete evidence of their value we offer this indication in contra-distinction to otherwise prevailing conditions: The Bullard Plant is busy, at present, producing equipment against orders placed by executives in several industries, Executives who are convinced of Bullard Economy and who know the profit-building qualities of Bullard production equipment.

BULLARD EQUIPMENT UNITS

THE MAXI-MILL
44" 54" 61"

THE VERTICAL TURRET LATHE
24" 36" 42" 54"

THE MULT-AU-MATIC
8" 12" 16"

THE CONTIN-U-MATIC
10" 18"

Send for descriptive circulars

FOR EXECUTIVES

BULLARD

BRIDGEPORT CONNECTICUT

o o o

AN early example of "ex appeal" in machine tool selling is represented in this advertisement which appeared in 1924.

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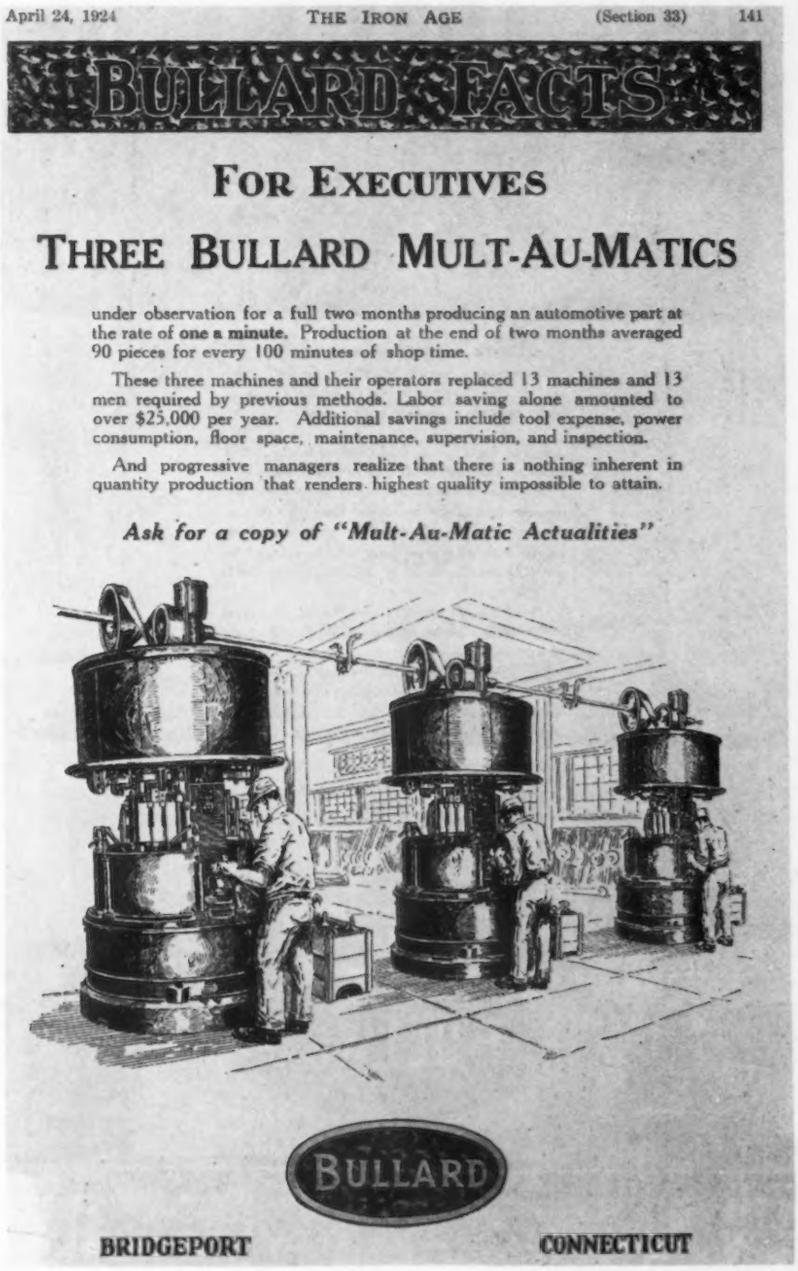
determined we entered advertisements of our vertical turret lathes in *Railway Age*, a trade paper written exclusively for railroad executives. At this particular time the railroads were starting an exceedingly heavy buying program and we sensed the advisability of acquainting those executives that would pass upon appropriations of what our machines were and what they would do for them. The railroads are one of the major buyers of vertical turret lathe equipment and we could well afford this specialized advertising. In addition to telling, in our copy, what Bullards would do in their shops, we attempted to inform the railroad executives, who usually come up from the operating end, a little about the shop man's problem. The copy of our advertisement appearing in the Jan. 17, 1925, issue of *Railway Age* is typical of the approach used. (See following page.)

It should be noted that no mention is made of machine features or even sizes. The entire emphasis is placed on profits and in the manner railroad executives consider their shop problems. Railroad shops are a necessary evil to rail-



April 24, 1924 THE IRON AGE (Section 33) 141

BULLARD FACTS

FOR EXECUTIVES

THREE BULLARD MULT-AU-MATICS

under observation for a full two months producing an automotive part at the rate of **one a minute.** Production at the end of two months averaged 90 pieces for every 100 minutes of shop time.

These three machines and their operators replaced 13 machines and 13 men required by previous methods. Labor saving alone amounted to over $25,000 per year. Additional savings include tool expense, power consumption, floor space, maintenance, supervision, and inspection.

And progressive managers realize that there is nothing inherent in quantity production that renders highest quality impossible to attain.

Ask for a copy of "Mult-Au-Matic Actualities"

BULLARD

BRIDGEPORT CONNECTICUT

o o o

EXECUTIVES are interested in profits. This advertisement recognized that fact and capitalized it twelve years ago.

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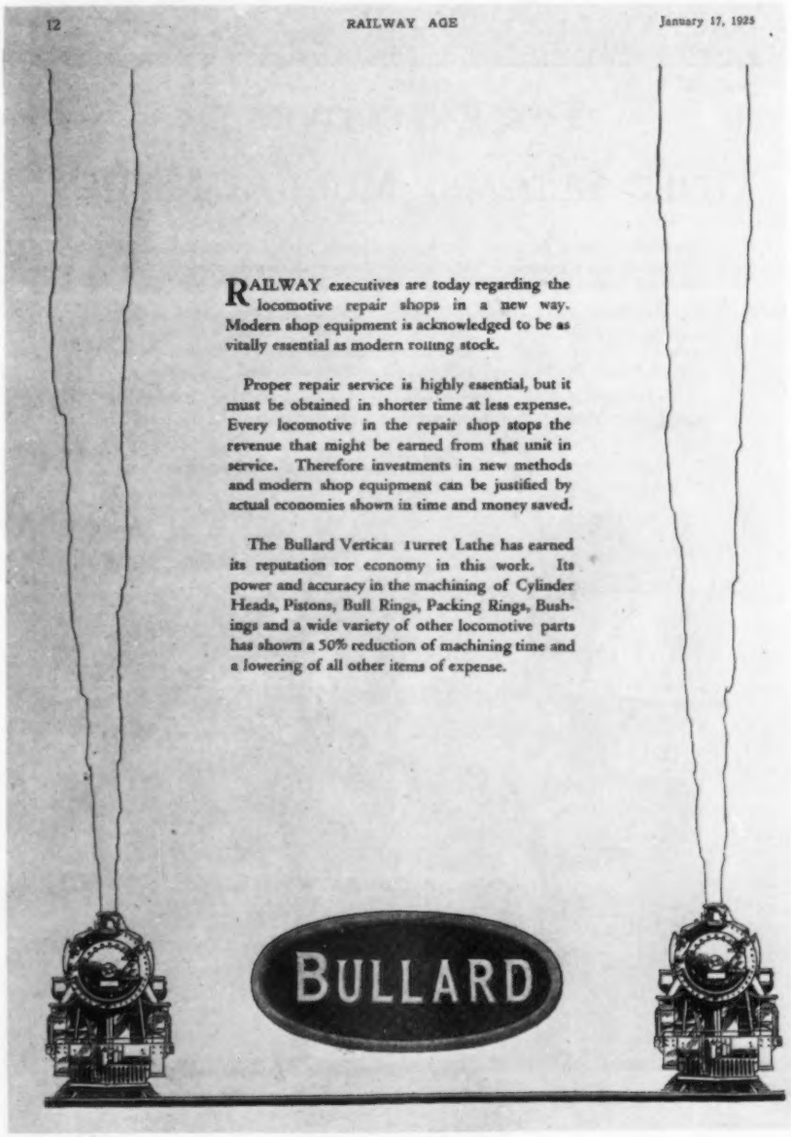
roading. It is more important to repair quickly regardless of expense than to cut costs and keep motive power idle longer. The main objective is to keep motive power on the road earning money and not in the repair shop, and the appeal must be in that direction.

Our experience in advertising direct to the chief executives from the profit angle alone has convinced us of the merit of this approach. We have broadened our coverage of the executive since 1923 and are now advertising in other executive business and trade publications in addition to IRON AGE and *Railway Age*. Today a very large share of our advertising budget is spent in this way. It may be that we have a slightly different problem in the merchandising of our tools when compared with other machine tool companies because our units are large and are seldom purchased, even by sizable corporations, without executive approval. However, it is believed that on any form of equipment requiring an expenditure of thousands of dollars, much can be gained by appealing to the higher-ups; and today, with the necessity of real creative selling, it becomes of paramount importance.


12 RAILWAY AGE January 17, 1925
RAILWAY executives are today regarding the locomotive repair shops in a new way. Modern shop equipment is acknowledged to be as vitally essential as modern rolling stock.
Proper repair service is highly essential, but it must be obtained in shorter time at less expense. Every locomotive in the repair shop stops the revenue that might be earned from that unit in service. Therefore investments in new methods and modern shop equipment can be justified by actual economies shown in time and money saved.
The Bullard Vertical Turret Lathe has earned its reputation for economy in this work. Its power and accuracy in the machining of Cylinder Heads, Pistons, Bull Rings, Packing Rings, Bushings and a wide variety of other locomotive parts has shown a 50% reduction of machining time and a lowering of all other items of expense.
BULLARD

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ONE year later, the same principle of executive appeal was extended, profitably, to the railroad field.

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HOW TO WELD TWENTY-NINE METALS

o o o

By CHARLES H. JENNINGS

Engineer in Charge of Welding Research, Westinghouse Electric & Mfg. Co.

o o o

THIS is the third article in an extensive series by Mr. Jennings. The first installment appeared in The Iron Age of Dec. 24 and the second in the issue of Dec. 31, 1936. Subsequent chapters will appear in ensuing issues.

o o o

Chromium-Vanadium Steels (S.A.E.-6115)

These steels contain chromium and vanadium as alloying elements and may be welded without difficulty in the low carbon ranges. The addition of chromium to steels lowers the carbon content of pearlite and diminishes the rate of carbon diffusion. It also imparts air-hardening properties in percentages over 0.3 per cent, but this is not important in connection with steels of this grade because the chromium content is generally about 1.0 per cent. Vanadium improves the properties imparted to steels by chromium by virtue of its carbide-forming properties. It produces a finer and denser structure to the metal, increases the tensile strength and yield point, and lowers the ductility slightly.

Typical chemical analysis and physical properties of a chrome-vanadium steel are given in Table XXIII.

TABLE XXIII

Chemical Analysis of Chrome-Vanadium Steel

Carbon	0.10-0.20 per cent
Silicon	0.20-0.30 per cent
Manganese	0.30-0.60 per cent
Chromium	0.80-1.10 per cent
Vanadium	0.15-0.20 per cent
Phosphorus	0.04 per cent
Sulphur	0.045 per cent

Physical Properties of Chrome-Vanadium Steel

Yield point, lb. sq. in.	60-70,000
Tensile strength, lb. sq. in.	80-90,000
Elongation, per cent in 2 in.	25-35
Reduction of area, per cent	50-55

Chrome-vanadium steels with low carbon ranges can easily be welded with many types of shielded-arc electrodes. Preheating although not required on light sections is often beneficial. Temperatures of 300-500 deg F. will be found satisfactory if preheating is desired.

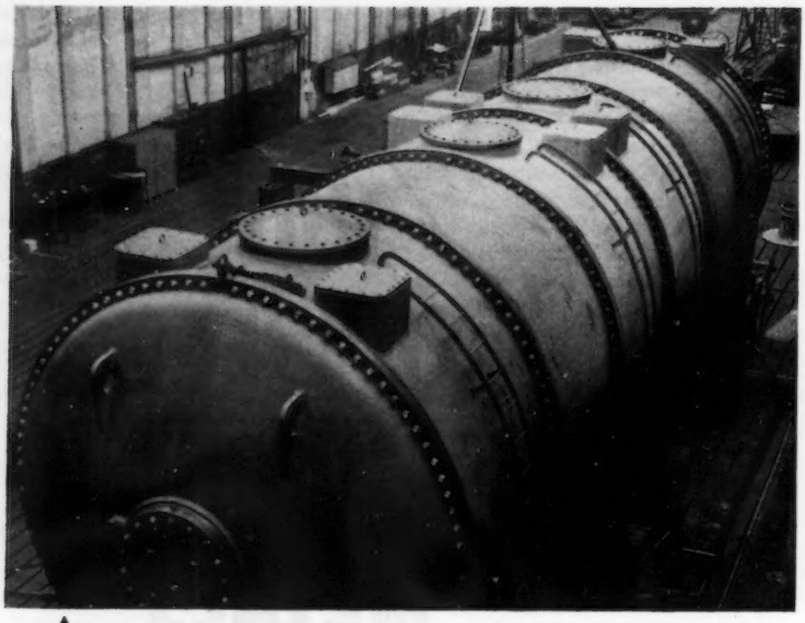
Carbon-molybdenum or chrome-vanadium electrodes are recommended for welding this grade of steel as they produce welds with physical properties comparable to the base metal. Typical physical properties of welds made with carbon-molybdenum electrodes are given in Table XXIV.

TABLE XXIV

Physical Properties of Welded Chrome-Vanadium Steel
C, 0.18; Mn, 0.40; Cr, 0.92; V, 0.16; Si, 0.15

Yield point, lb. sq. in.	65,000
Tensile strength, lb. sq. in.	90,000
Elongation, per cent in 2 in.	22
Reduction of area, per cent	46

Subsequent annealing is gener-



AUTOMATIC arc welding a generator frame on a welding manipulator.

ally not required on this grade of steel because of the heat of welding. For purposes of stress relief, however, annealing at 1100-1200°F. is often practiced. It is important, therefore, to point out that chrome-vanadium steels are sometimes subject to temper brittleness.

Tests made on this grade of steel have shown a reduction in impact strength from 40 to 1-2 ft. lb. by strain annealing at 1150°F. The use of chrome-vanadium steels should be carefully considered, therefore, if strain annealing is to be applied to the finished structure.

Chrome-Molybdenum Steels

These steels contain chromium and molybdenum as alloying elements and generally have relatively high percentages of carbon. The addition of molybdenum to chrome steels increases the toughness without decreasing the ductility. In addition, molybdenum tends to refine the pearlite and minimize grain growth at elevated temperatures.

Steels of this type although sorbitic in the normalized condition have marked air-hardening properties and welding produces hard and brittle fusion zones. As a result, preheating from 300 to 500°F. is recommended before welding.

Typical physical properties and chemical analysis of this grade of steel are given in Table XXV.

TABLE XXV

Chemical Analysis of Chrome-Molybdenum Steel (S.A.E. X4130)

Carbon	0.25-0.35 per cent
Manganese	0.40-0.60 per cent
Chromium	0.80-1.10 per cent
Molybdenum	0.15-0.25 per cent
Phosphorus	0.40 per cent max.
Sulphur	0.45 per cent max.

Physical Properties of Chrome-Molybdenum Steel (S.A.E. X4130)

Yield point, lb. sq. in.	60-70,000
Tensile strength, lb. sq. in.	100-110,000
Elongation, per cent in 2 in.	20-30
Reduction of area, per cent	50-60

Shielded-arc carbon-molybdenum electrodes are recommended for welding this steel. Bare type electrodes can be used, but the resultant welds are extremely brittle. The welding procedure recommended is similar to that for the welding of low carbon steels except that preheating is required.

Subsequent heat-treatment after welding is recommended for the best results. Annealing temperatures of 1100-1200°F. are very satisfactory for general constructional work.

Typical physical properties of welds made on chrome-molybdenum steels with carbon-molybdenum electrodes are given in Table XXVI.

Manganese-Vanadium Steels

These steels contain manganese and vanadium as alloying elements to impart the higher physical properties to the steel. Steel containing manganese contents from 1.25 to 2 per cent (the range used in these steels) frequently show excessive grain growth. The addition of as little as 0.1 per cent of vanadium will greatly retard this grain growth and eliminate manganese segregation.

Manganese-vanadium steels are especially suited to welding because their carbon content is low. The parent metal adjacent to the weld is subject only to moderate air-hardening and the resultant joints can withstand severe stress and bending without failure.

The chemical analysis and physical properties of manganese-vanadium steels are given in Table XXVII.

TABLE XXVII

Chemical Analysis of Manganese-Vanadium Steel

Carbon	0.15-0.20 per cent
Manganese	1.25-2.0 per cent
Silicon	0.20-0.30 per cent
Vanadium	0.15-0.20 per cent
Phosphorus	0.04 per cent
Sulphur	0.04 per cent

Physical Properties of Manganese-Vanadium Steel

Yield point, lb. sq. in.	70-80,000
Tensile strength, lb. sq. in.	100-110,000
Elongation, per cent in 2 in.	20-30
Reduction of area, per cent	40-50

The use of shielded-arc electrodes is preferred on this alloy in order to produce the highest physical properties. Electrodes of the carbon-molybdenum or chrome-vanadium types are recommended.

Preheating is not required, but will be found beneficial for heavy sections. Heat treatment is not required after welding to produce good ductility in the fusion zone although it will be found beneficial. Annealing temperatures of 1100-1500°F. are satisfactory.

TABLE XXVI

Physical Properties of Welded Chrome-Moly Steel
C, 0.30; Mn, 0.45; Cr, 0.90; Mo, 0.17

Treatment	Yield Point Lb. sq. in.	Tensile Strength Lb. sq. in.	Elongation Per Cent in 2 in.
As welded	60,000	80,000	28
Annealed 1200° F.	55,000	75,000	34

Typical physical properties of welds made on manganese-vanadium steels with carbon-molybdenum electrodes are given in Table XXVIII.

TABLE XXVIII

Physical Properties of Welded Manganese-Vanadium Steel
C, 0.19; Mn, 1.62; Si, 0.25; V, 0.17

Yield point, lb. sq. in.	66,000
Tensile strength, lb. sq. in.	95,000
Elongation, per cent in 2 in.	22
Reduction of area, per cent	35

12-14 Per Cent Chromium Stainless Steels

This alloy is a stainless steel and has marked air-hardening properties even in the low carbon ranges. As a result, the carbon content is generally held below 0.12 per cent and the alloy has only limited weldability.

The 12-14 per cent chrome alloy, especially in the low carbon range, has excellent mechanical properties and is often used because of them rather than because of its corrosion-resisting properties. It is readily heat treated and develops high tensile, ductility, impact and fatigue properties.

The fact that this alloy has marked air-hardening properties, preheating followed by immediate annealing after welding is required.

Additions of small amounts of titanium and aluminum reduce the air-hardening properties of 12-14 per cent chromium steels and make them more suitable for welding. The addition of these elements of course adversely affect the ability of the material to respond to heat-treatments intended to increase the tensile properties.

The chemical analysis and physical properties of this alloy are given in Table XXIX.

TABLE XXIX

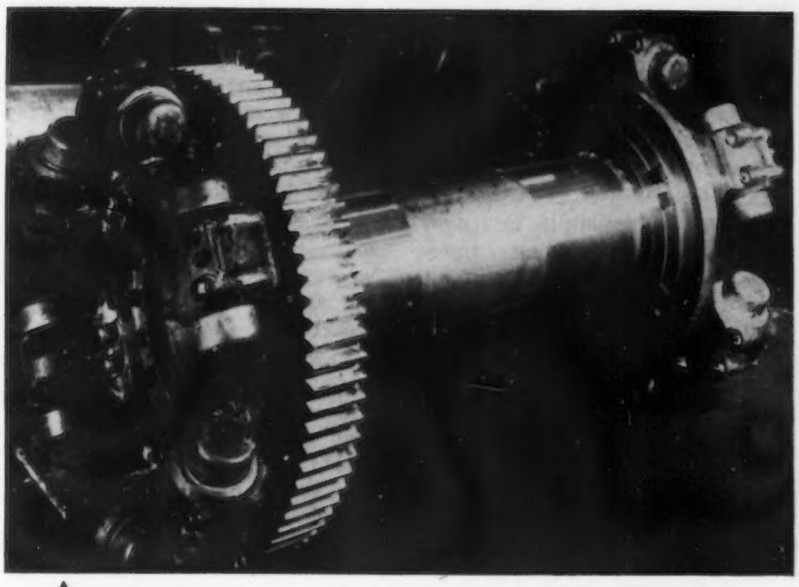
Chemical Analysis of 12-14 Per Cent Chromium Steel

Carbon	0.10 per cent
Chromium	13.2 per cent
Manganese	0.30 per cent
Silicon	0.39 per cent

Physical Properties of 12-14 Per Cent Chromium Steel

Yield point, lb. sq. in.	53,000
Tensile strength, lb. sq. in.	78,600
Elongation, per cent in 2 in.	34
Reduction of area, per cent	60

Electrodes of an analysis similar to that of the base metal may be used. In addition, electrodes containing 18 per cent chrome–8 per cent nickel, and 25 per cent chrome–12 per cent nickel may be used. Welds made with 12-14 per cent chrome electrodes will be hard and brittle and subsequent heat treatment must be applied to improve their ductility. Welds made with the chrome-nickel electrodes are more ductile, but the fusion zone of the base metal will still be brittle; consequently, subsequent heat-treatment must be used to produce a ductile joint.



ARC-WELDED driving quill for Pennsylvania railroad electric locomotives.

The electrodes of an analysis similar to the base metal are generally recommended for this alloy. The heat-treatment after welding that is required to obtain the best physical properties in the fusion zone may be injurious to welds made with 18 per cent chrome–8 per cent nickel electrodes.

The recommended annealing procedure for welded structures made of this alloy is to anneal at 1450-1500°F., soak for a long period of time, furnace cool to 1100°F., and air cool below this temperature. Following this initial treatment, any heat-treatment desired may be given to the structure.

Typical physical properties of welds made on 12-14 per cent chromium stainless steels are given in Table XXX.

When welding this grade of stainless steel, it must be remembered that the electrical resistance is high and the thermal conductivity is low. As a result, the welding current used for a given diameter of electrode should be about 10 per cent lower than the corresponding current for plain carbon steels. Reverse polarity (electrode positive) should be used.

16-18 Per Cent Chromium Stainless Steels

Alloys of this type contain from 15 to 18 per cent chromium with carbon contents below 0.15 per cent. The fact that for a given chromium content the hardening capacity varies directly with the carbon content makes it desirable to keep the carbon content below 0.10 per cent when welding is applied. Chromium contents near the minimum range are also desirable.

This alloy is ferritic, consequently there is no phase change on heating or cooling and recrystallization or refinement of

TABLE XXX

Physical Properties of Welded 12-14 Per Cent Chromium Steel
C, 0.10 Per Cent; Cr, 13.2 Per Cent; Mn, 0.30 Per Cent; Si, 0.39 Per Cent

Treatment	Yield Point Lb. Sq. In.	Tensile Strength Lb. Sq. In.	Elongation, Per Cent in 2 In.
As welded	32,400	43,700	4
Annealed 1450° F.	45,000	70,800	20

the grain structure will not take place. The sole effect of heating at high temperatures is to coarsen the crystalline structure: above certain temperatures this action takes place very rapidly. The only means of grain refinement is by mechanical working of some sort.

Carbon is present in this alloy in the form of carbides interspersed among the ferrit crystals. When the steel is heated above 1800°F. these carbides go into solution, but upon subsequent cooling they precipitate out and form a hard, brittle constituent. The result is a definite decrease in ductility.

It is possible to weld this alloy without preheating, but this practice is not recommended unless the plates are of thin gage. Preheating to about 200-400°F. is recommended for the best results.

Joints in the "as welded" condition are hard and brittle, and subsequent annealing must be employed to restore their ductility. The restoration of ductility to the joint is obtained by carbide spheroidization rather than the recrystallization of the grains. The recommended annealing procedure is to heat to 1450-1500°F. followed by slow cooling.

The chemical analysis and physical properties of 16-18 per cent chrome steels with good weldability are given in Table XXXI.

TABLE XXXI

Chemical Analysis of 16-18 Per Cent Chromium Stainless Steel

Carbon	0.10 per cent
Chromium	16.5 per cent
Manganese	0.50 per cent
Silicon	0.88 per cent

Physical Properties of 16-18 Per Cent Chromium Stainless Steel

Yield point, lb. sq. in.	45-60,000
Tensile strength, lb. sq. in.	70-90,000
Elongation, per cent in 2 in.	25-35
Reduction of area, per cent	60-75

Welding electrodes of an analysis similar to the base metal are recommended although 18 per cent chrome–8 per cent nickel electrodes can be used. If electrodes of the chrome-nickel type are used it must be remembered that their coefficient of expansion is considerably greater than that of the parent metal. This condition may cause ultimate failure of the joint if the structure is repeatedly heated and cooled.

Physical properties of welds made on 16-18 per cent chromium steels by using electrodes of similar analysis are given in Table XXXII.

This alloy has high electrical resistance and low heat conductivity, consequently the welding current used for a given electrode should be about 10 per cent lower than that used for the corresponding diameter of low carbon electrode. Excessive puddling is not recommended and the amount of welding done should be held to the minimum to prevent excessive grain growth.

18 Per Cent Chrome—8 Per Cent Nickel Stainless Steel

This alloy is austenitic and is readily welded. It has high physical properties combined with good corrosion-resisting properties. Because of this it is the most extensively used of all the stainless steels. It is readily worked and formed into any desired shape.

Although this alloy may be welded easily, it is recommended that the carbon content be held low (preferably below 0.07 per cent) to prevent loss of corrosion-resisting properties as a result of the heat of welding.

The fact that 18-8 stainless steel is austenitic insures good weldability and high quality welds from the physical standpoint. The greatest trouble encountered from welding is the formation of chromium carbides which are extremely hard and brittle. These carbides are responsible for a reduction in the corrosion-resisting properties.

When this alloy is heated from 900-1500°F. for a short time and slowly cooled, chromium rich carbides separate out in the grain boundaries. The precipitation of these carbides occurs at the expense of the chromium content of the grains in zones adjacent to the boundaries. The decrease in the chromium content in these regions reduces their resistance to corrosion so that corrosion occurs in the grains along the zones running next to the boundaries. This corrosion phenomenon is known as intergranular corrosion.

It is obvious from the above reason for carbide precipitation that the higher the carbon content the greater is this difficulty. Experience and research have shown that little trouble is experienced if the carbon content is maintained below 0.07 per cent.

Additions of titanium or columbium to the alloy is an effective means of preventing carbide precipitation and the resulting tendency to intergranular corrosion. These elements form carbides thereby leaving the chromium in solution. For effective results the amount of titanium present should be at least six times the amount of carbon in excess of 0.02 per cent. If columbium is used, it should be present in quantities of about ten times the amount of carbon.

If carbide precipitation is obtained, and corrosion resistance is essential, the structure should be heat treated. The recommended heat treatment consists of heating the welded parts to 1900-2100°F. followed by rapid cooling. Air cooling will be found satisfactory for thin parts.

The chemical analysis and physical properties of 18-8 chrome-nickel steels are given in Table XXXIII.

TABLE XXXIII

Chemical Analysis of Austentic 18-8 Stainless Steel

Carbon	0.11 per cent max.
Chromium	17.0-18.0 per cent
Nickel	7.0-9.0 per cent
Manganese	0.50 per cent max.
Silicon	0.75 per cent max.

Physical Properties of Austentic 18-8 Stainless Steel

Yield point, lb. sq. in.	30-40,000
Tensile strength, lb. sq. in.	85-95,000
Elongation, per cent in 2 in.	55-60
Reduction of area, per cent	60-70

Electrodes of a similar analysis are recommended for welding this alloy although 25-12 chrome-nickel electrodes are satisfactory. These electrodes should be of the shielded-arc type and should be used on reverse polarity.

TABLE XXXII

Properties of Welded 16-18 Per Cent Chromium Stainless Steels

C, 0.08 Per Cent; Cr, 17.2 Per Cent; Mn, 0.29 Per Cent; Si, 1.05 Per Cent

Treatment	Yield Point Lb. Sq. In.	Tensile Strength Lb. Sq. In.	Elongation, Per Cent in 2 In.
As welded	41,500	53,000	3
Annealed 1450° F.	50,800	73,000	20

The high electrical resistance of this alloy makes it necessary to use welding currents about 10 per cent lower than those used on plain carbon steels. The high coefficient of expansion and the low thermal conductivity tend to cause high local expansion which produces excessive buckling and residual stresses in the weld. As a result it is essential to properly brace the structure during welding.

Physical properties obtained from welds made on this alloy are given in Table XXXIV.

25-12 Stainless Steel

This is an austenitic alloy and from the standpoint of weldability is almost identical to the 18-8 variety of austenitic stainless steel. The higher percentages of alloying elements present, however, generally prevent the troubles encountered from carbide precipitation on the 18-8 stainless steels.

Typical physical properties and chemical analysis for 25-12 chrome-nickel stainless steels are given in Table XXXV.

TABLE XXXV

Chemical Analysis of 25-12 Stainless Steel

Carbon	0.20 per cent max.
Chromium	22.0-26.0 per cent
Nickel	12.0-16.0 per cent
Silicon	0.50 per cent
Manganese	1.12 per cent

Physical Properties of 25-12 Stainless Steel

Yield point, lb. sq. in.	57-80,000
Tensile strength, lb. sq. in.	117-136,000
Elongation, per cent in 2 in.	24-40
Reduction of area, per cent	39-54

This alloy should be welded with an electrode having an analysis similar to the base metal if equal corrosion-resisting properties are required. The procedure of welding is similar to that discussed for the 18-8 chrome-nickel stainless steels.

Typical physical properties of welds made on 25-12 stainless steel are given in Table XXXVI.

TABLE XXXVI

Physical Properties of Welded 25-12 Stainless Steel
C, 0.20; Cr, 25.4; Ni, 13.2

Yield point, lb. sq. in.	62,000
Tensile strength, lb. sq. in.	95,000
Elongation per cent in 2 in.	30
Reduction of area, per cent	48

Stainless Clad Steel

Stainless clad steel is a composite material consisting of a mild carbon steel having a thin surface of stainless steel. If a heavy plate is required for strength reasons, a structure made of solid stainless steel becomes very expensive. The fact that only a thin layer of stainless steel is required for corrosion-resisting purposes makes it possible to replace a solid stainless steel plate by a low carbon plate containing a stainless steel surface. Such a composite plate affords adequate resistance to corrosion, at the same time being much less expensive. As a result, this type of material is becoming widely used as a substitute for solid stainless steel plates.

The stainless surface on stainless clad steels may be any one of a number of grades of stainless steel. In general, it is recommended that for the welding of this surface an electrode of similar analysis be used. For 18-8 stainless coatings the 25-12 chrome-nickel electrodes are often preferred as they give better corrosion protection. The 18-8 chrome-nickel electrodes can be used with complete satisfaction. However, when welding the straight chrome steel coatings, it is desirable to use an electrode with slightly higher chromium content than that of the base metal.

The mild carbon steel section of a stainless clad plate should be welded with coated or shielded-arc type electrodes.

To prevent excessive contamination of the stainless steel, it is recommended to do the stainless steel welding first and the mild steel welding last. If a coated electrode is used for the mild steel welding, no trouble from porosity or poor fusion will be experienced.

Small diameter electrodes and low currents are recommended for welding stainless steels. When depositing the mild steel weld metal, string beads are recommended to prevent excessive heating of the stainless surface. Peening is not required.

Properly made welds on this composite plate material will have good strength and ductility and the stainless clad surface will have satisfactory corrosion-resisting properties.

(TO BE CONTINUED)

JOINT designs for welding stainless clad steels.

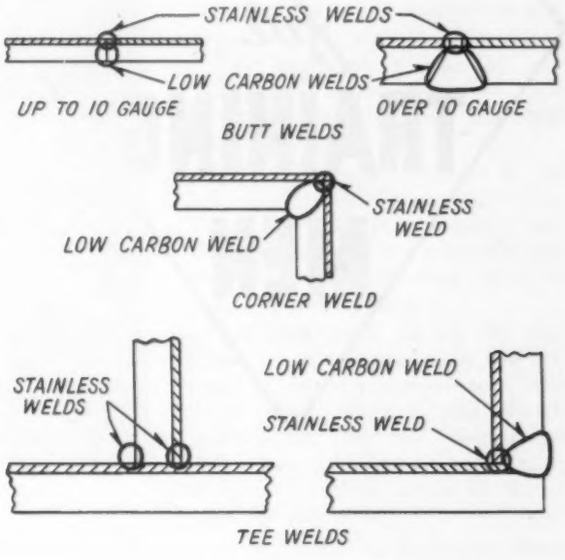


TABLE XXXIV

Properties of Welds Made on 18-8 Stainless Steel
C, 0.10; Cr, 18.2; Ni, 8.1

Treatment	Yield Point Lb. Sq. In.	Tensile Strength Lb. Sq. In.	Elongation Per Cent in 2 In.	Reduction of Area Per Cent
As welded	50,750	81,000	44	58.2
Annealed 1900° F.	37,000	78,500	45	59.0

INDUSTRY'S RESPONSIBILITY for TRAINING MEN

By CHARLES J. STILWELL
Vice-President, Warner & Swasey Co., Cleveland

IN pre-depression days, industry thoroughly realized its responsibility for training men. The vocational schools and trade schools turn out boys of high school age, with one to three years of general instruction in the trades they have picked out, and a smattering of reasonably useful information. All this helps—but it does not take the place of practical experience at a machine.

Our own company, for instance, years ago established a four-year apprentice training course. Young men were taken in, taught the operation of one machine after another, given a thorough understanding of shop practice, and finally graduated as finished machinists. As a matter of fact, the machine tool industry — through apprentice training courses such as this—was responsible in those days for the original training of the majority of men employed in machine operations in most of the important industries in the country.

With the advent of the depression, it was impossible for the machine tool industry to continue apprentice training courses. This shut off the potential supply of newly trained men, not only for the machine tool industry but for other industries.

In fact, industry trained practically no new men for over five years. How, then, could industry expect to find trained men available among the unemployed when the upturn came?

Machine tool builders were among the first to experience the shortage of skilled labor. Many of their men, let out during the depression, had scattered here and there and could not be regained.

Our own company, recognizing this situation, immediately re-installed our apprentice training course—and we now have in that course more men than we have had for seven years.

But the apprentice training course is too slow. It takes four years for a boy to complete it. We cannot wait that long. We must have men capable of operating machines immediately.

Throughout all industry there is a serious and urgent demand for more men now capable of operating specific machines. How are we to secure these men? How are we going to convert men who are all thumbs and questions into men who can quietly take their places at the machines assigned and do a really good day's work?

To meet the immediate employment situation of our own company, we have adopted a plan which we call the "Learners' Plan," as distinguished from the apprentice training system. I cite this plan simply because I believe it

may point the way toward a system which may be adopted throughout all American industry.

The "Learners' Plan"

This plan is founded upon a very simple premise. If we can't wait to train a man for all operations, the obvious thing to do is to train him for one or, at most, several operations and put him to work at them.

That is what we are doing today. In our employment office we take in regularly a certain number of new men. We do not hold out any false promises to these men. They belong in our learners' group, as distinguished from our apprentices. We try them out on the simpler machine tool operations. It shortly becomes evident as to whether a man has any aptitude for machine work, and whether he has the perseverance and willingness which will make him a reliable employee. If he has aptitude and willingness, we keep him. After he has mastered the operation of one machine, we transfer him to another slightly more difficult machine and put a new learner on his original job. His pay advances as he learns.

Thus we are actively engaged in a sorting-out process. From among the unemployed we are selecting the employable, as distinguished from the unemployable and the marginal group.

The Unemployed

Our experience along this line has led to some very interesting conclusions as to the unemployment situation in this country.

I am convinced that there are nowhere near as many workers still unemployed as we are led to believe by the estimates currently published on this subject.

Note that I use the word "workers." The fallacy in a great deal of the recent comment on the unemployment situation is that men who can and will work, and men who can't or won't work, have been lumped together in a common category.

Obviously the men who can't or won't work cannot be reabsorbed into industry, and do not constitute a potential labor supply—and a large share of those currently included in unemployment estimates fall into this classification. The fact that a man has "worked" on PWA, for instance, is no indication that, by character or ability, he is capable of industrial employment. We have always had a large number of men unfit for earning a living in industry, or at least so subnormal in intelligence and adaptability that they are never employed except in conditions of extreme labor scarcity, when anybody who knows how to push a wheelbarrow from here to there is at a premium.

CHARLES J. STILWELL

Now, if we exempt the unemployables from our calculations, we find that the number of men now unemployed who are of the type which industry can use is by no means as large as is commonly supposed.

This is self-evident from the fact that today, according to our own experience and reports of industrial concerns generally, *practically all men who have had any sort of industrial training at all are now employed.* The only skilled workers still looking for work are men over fifty—and they are rapidly being absorbed.

There are few trained men today under twenty-nine years of age, because we have trained no men for over five years. In the machine tool industry every skilled workman between twenty-nine and fifty, who really wants to work, now has a job. Skilled men of over fifty, who have been tardily reemployed because of their age, are now being snapped up in a hurry. In our own company we have no age limit. We find the experience and dependability of older men valuable. I wish we could find more skilled men in the older age brackets. The fact is that there are not enough of them still unemployed to make a dent in the unemployment picture.

The men we pick for our "Learners' Plan," therefore, are selected from two groups of young men:

(1) Young men from 18 to 23, who compose the generation who, under normal circumstances, are engaged in selecting industrial occupations and entering upon a trade or employment.

(2) Men from 23 to 29, who grew up co-incident with the advent of the depression—men who have been buffeted and disappointed by five bad years, and have had no chance, until now, even to try their hands at industrial employment.

It is interesting to see how these age groups react when they are tried out on the basis of the reemployment plan above described.

Among the group from 18 to 23, who are taken in as "learners," we find about the same degree of aptitude and willingness for machine tool work as one would expect from any new generation in any period.

Most interesting is our experience with the men from 23 to 29—the people who came of maturity during depression years, and are only now, after five years of discouragement, obtaining what might be considered a normal opportunity to get along in the world.

Do We Have a Lost Generation?

In England, this summer, I visited a large number of factories. I was impressed with the fact that the majority of the men in many of the plants were younger men—men who had grown up since the depression.

Upon inquiry, I found that British industry had had difficulty in re-employing the men of its depression generation. Many of the men who came of age at the start of the depression had lived for so

many years without knowing what it was to get a job or even a chance at a job, that they had eventually become practically unfit for any type of productive employment and would have to be kept on the dole for the rest of their lives. These men represent, industrially, a "lost generation."

The British depression somewhat antedates our own. In this country the "depression generation" are the group between the ages of 23 and 29, referred to above. It is very encouraging to find that on the basis of our experience, no "lost generation" is here in the making. Of course, there are many unemployables in this group —but the ratio is practically the same as in any other age group.

Many of the men between the ages of 23 and 29, who come in under our "learners'" plan, feel disgusted and disgruntled. They say that the world has given them a raw deal. They say that until now they have never even had a chance to learn any kind of trade. Nevertheless, the same percentage of men between the ages of 23 and 29 make good under our "learners'" plan as is the case with men between 18 and 23.

Apparently American workmen —relief or no relief—have an independence of thought and a stamina of character which is proof against perpetual acceptance of public charity. Or perhaps they have not been on the dole long enough for it to have made any permanent impression upon their habits or ambitions. At any rate, we do not care whether a prospective learner is in the 18 to 23 class or in the 23 to 29 year class. We do not grade him on the basis of age. Our records show that he may have just as much aptitude and perseverence if he is 27 as if he is 19.

How the Learner's Plan Speeds Productivity

Our company is located in Cleveland, Ohio. The immediate demand in Cleveland is for workmen capable of performing specific machine operations. We cannot wait in Cleveland for apprentices to finish a four-year course. We do not need, as of this moment, a vast number of finished apprentices. We do need an enormous number of men who can do certain jobs.

It would be very fine if Cleveland had today hundreds of new all-around machinists. But we could get along very well if we just have enough capable turret lathe hands, boring mill hands, and so forth. If we had plenty of men who were capable of doing the simpler standard machine jobs, this would release our older, more experienced men for the specialized and more intricate operations.

In other words, men trained to do special jobs and no others, under a "learners'" course, will immensely increase industrial productivity.

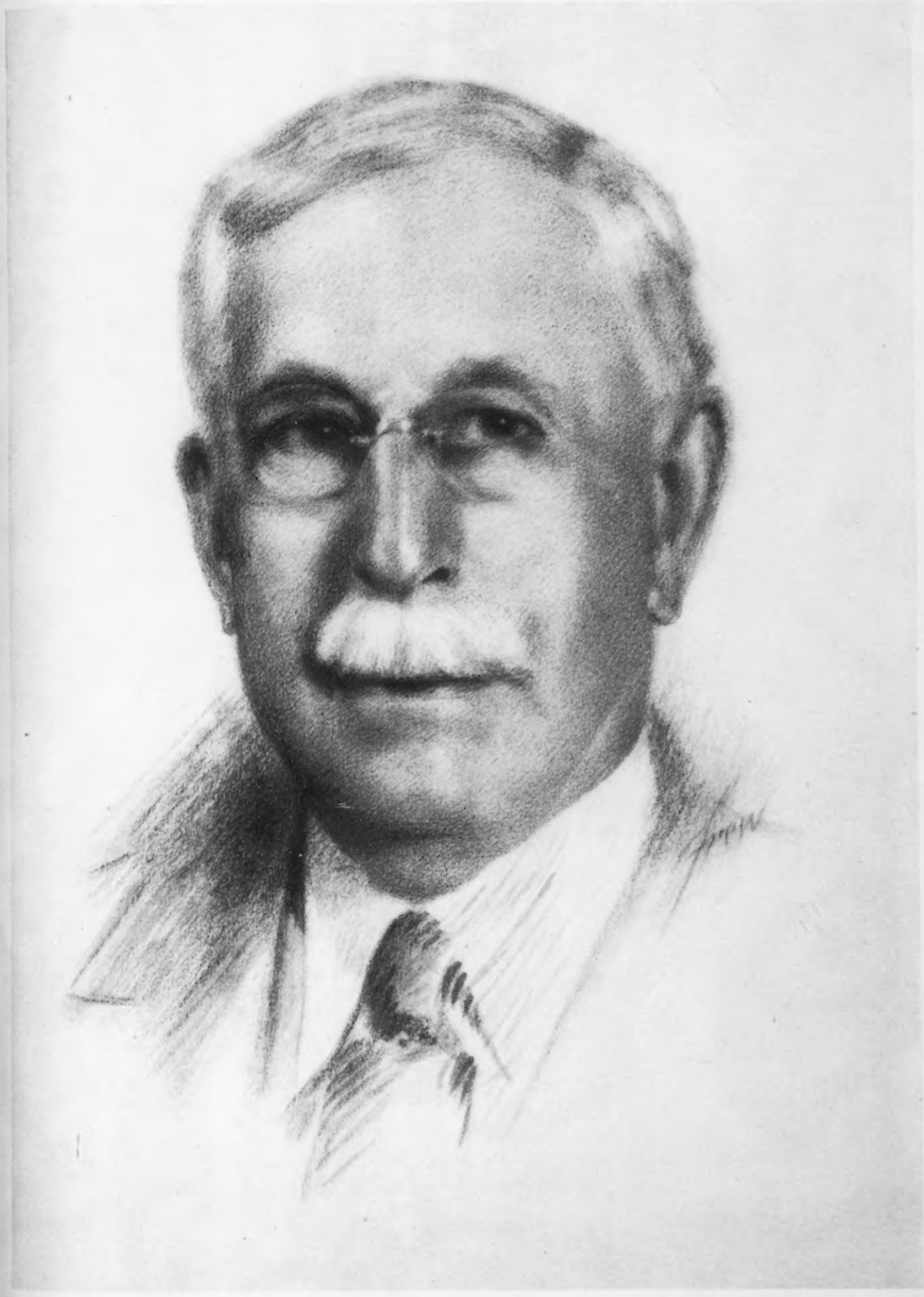
In this situation there is an interesting parallel between men and machines. Every shop superintendent knows that he has in his shop certain machines which are not universally adaptable, but which can perform perfectly well certain simple jobs. He knows that by keeping these machines in operation on such jobs, he can keep his more adaptable, more efficient machines free for doing the special, higher type jobs. In this way he succeeds in fitting his low adaptability machinery into the general scheme of production—and by so doing he may succeed in "getting by" until he can persuade the treasurer of the company to loosen up with enough money to buy the modern equipment necessary to rehabilitate the entire shop.

In this country today we are up against a problem of rehabilitation of man power. Unfortunately we cannot simply purchase a trained man. Training is not a matter of dollars—it is a matter of years. In the meantime, industry must "get by" by training men swiftly to operate specific machines or perform certain individual operations.

With the tremendous urge toward greater productivity which is today becoming more apparent in every branch of industry, it is my firm belief that within a comparatively short period of time it will be not only possible, but necessary, for American industry to absorb, under a "learners'" plan, practically all of the unemployed who fall into the employable class.

▼ ▼ ▼

HENRY PRENTISS, chairman of the board of Henry Prentiss & Co., is the dean of machine tool merchandisers. Born in Hubbardston, Mass., in 1846, he started work in Boston in 1864 after attending Worcester Academy. Eleven years later he established his present widely known company. Now in his 91st year, Mr. Prentiss has completed 72 years of exceedingly useful effort.



HENRY PRENTISS, President, Henry Prentiss & Co. Drawn by John Frew for The Iron Age.

REVIEW OF PROGRESS *in* METAL FINISHING

By HERBERT R. SIMONDS
Vice-President, Metals and Plastics Bureau
Rockefeller Center, New York

THIS is the conclusion of the review of metal finishing by Mr. Simonds, the first section of which appeared in the issue of Jan. 7.

Lacquers and Paints

TO compete with electroplating, manufacturers of synthetic lacquers have developed a coating which may be put on steel strip at the mill and which subsequently may be stamped and formed in many of the usual fabricating processes without injury.

The Mass & Waldstein Co. considers that the increased use of die castings during 1936 was one of the most important factors in determining the development of metal-finishing processes. One of the products of the company resulting from a study of die castings is an enamel, known as Dykast Enamel, said to adhere tenaciously and continuously to zinc in one-coat application. This enamel is supplied in 32 standard shades.

Other new products of this company are Durad enamels developed for metal products subject to severe service conditions and especially for oil heaters, air-conditioning equipment and washing machines, and Metalustre, an air-drying finish designed to give a lustrous metallic effect.

The Zapon Co. has brought out several new finishes, including a spraying enamel, which air dries dust-free in 5 min. The novelty finishes of this company include veiling lacquer, spray Izarine and a crinkly finish known as Kristokrak.

The Roxalin Flexible Lacquer Co. announces that one of its important developments during the year has been the harnessing of rubber to lacquer applications just as it harnessed nitrocellulose 10 years ago. This new rubber base coating, known as Roxyn C, is said to be a resistant to alkalis, acids, and alcohol, and to lend itself to the usual methods of application. In addition, extreme flexibility is claimed for this particular coating along with a wide variety of colors. One important application was made in the manufacture of beer trays. Material in the flat sheet was coated, then blanked, then formed and drawn at an unusually sharp angle and then put directly into service as the finished trays.

Air Spraying

Application of lacquers and paints by air spray has shown remarkable improvement. New types of nozzles have made it possible to spray simultaneously two or more colors in adjacent strips onto metal products with a sharp even line of demarkation between the resultant bands of color.

One of the newer spray nozzles

has in addition to the central opening which emits air and the coating material, two or more laterally located openings which emit air streams directed toward the central stream. The air pressure in these outer openings may be easily adjusted and in this way the size and form of the spray pattern on the work may be regulated.

Several of the processes for conditioning metal surfaces for paint are described elsewhere. However, one product applied like a paint as a first coat over galvanized iron and zinc-base die castings may be listed here. This is known as Lithoform, intended for use before painting and said to prevent the peeling of any standard paint.

The DeVilbiss Co., reporting on the developments of 1936, refers particularly to the improved equipment for automatic operation of spray painting in high-speed production work. The company also calls attention to the more extensive use of water wash and other types of modern exhaust systems for handling the vapor and residue of the newer finishing materials. This company states, "We feel it is the responsibility of the spray equipment manufacturer to keep abreast with changes constantly taking place in mills and in finishing processes. Because of the favorable acceptance of synthetic finishing materials, heavier production requirements and the greater appreciation of the advantages of good housekeeping for finishing rooms, there have been recent improvements in water wash exhaust systems, of which one is our centrifugal type."

Among the specialty finishes recently developed is one closely resembling cloth, produced by spraying cotton or rayon fiber over a film of synthetic lacquer before the film has had time to dry. Finishes made in this manner are rapidly replacing cloth backgrounds where cloth over metal or over wood was previously used.

A rubber and bitumen paint has been developed especially for exposed structural steel and for underground pipe. The product is said to be stable up to 400 deg. F. Rubber linings for metal containers are now being made by depositing the rubber electrolytically on to the metal.

Heil & Co. report the development of a protective coating known as Oxid-On, suitable for painting directly over rusted metal surfaces. It is said to penetrate the rust and prevent further corrosion.

Several interesting examples of different types of metal finish were exhibited in the construction of a Modernage house on Park Avenue, New York, during the past year. The walls and partitions of this house were made of copper bearing steel. The steel parts were given a priming coat of metallic oxide paint and a top coat of aluminum paint. The steel floors of the building were filled with a light insulating concrete which contains expanded vermiculite in its aggregate. Outside walls of the building were sprayed with a marble grit.

The Hilo Varnish Corp. reports a new product, Hilume; a vehicle for use with aluminum powder in application to metal surfaces. The vehicle seems to fuse with the metal so that the aluminum coating holds fast even though the metal be heated red hot. A report of a test of this coating by a customer is particularly interesting at this time when so many manufacturers are looking for a heat-resisting coating. In this report it was stated that the test piece, after painting on one side with aluminum and the Hilume binder, was placed in a humidity box for 98 days. It was then held over a flame until it was red hot, then was bent and twisted and finally submerged in high-test gasoline for 3 hr. After all of these tests the report states that the specimen still maintained its original finish and lustre.

Other recent products of the Hilo Varnish Corp. include a clear lacquer for chromium plate designed to kill the effect of any cyanide which may be left on the surface and a synthetic lacquer for use on aluminum which under test is said to have remained unaffected

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A GREAT variety of parts are now automatically descaled by the Bullard-Dunn process on machines of this type. Loading and unloading is at the front station, the other five stations taking care of all operations.

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under a 20 per cent salt spray for more than 1000 hr.

The company states, "By far the most popular finish this year is of the wrinkled or shrivel type intended to produce a rough surface on metal with one coat. Such a finish finds application where it is desired to hide an imperfect metal surface, thus lessening the need for care and expense in the preceding fabricating operations. Our new Shrivel finish has been perfected so that it will stand as long as 24 hr. before being placed in a baking temperature of 200 deg. F. and yet will develop a shrivel surface which is a good match for that produced when heat is applied shortly after coating."

Some typical items on which a shrivel finish is suitable are adding machines, airplane instruments, cash registers, electrical instruments, cameras, humidifiers, musical instruments, oil burners, phonographs, radios, typewriters and water heaters.

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THIS shows a miscellaneous group of decorative articles on exhibit at Metals and Plastics Bureau, illustrating electroplating by use of cyanides in solution.

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Rust-Proofing

OCT. 17 of the past year marked the twentieth anniversary of the start of important atmospheric corrosion tests on black iron and steel sheets. At first glance this may seem a relatively unimportant occasion. However, when it is considered that these tests have been continued in different parts of the country, with regular weekly reports for 20 years, it is seen to be a remarkable piece of unselfish industrial cooperation, and when the effect of the data thus collected is reviewed, it is seen to be far reaching not only in industry but in life.

As a direct result of the tests, modifications in design have been made in nearly every branch of the metal-working field. In the case of railroads, the life of plate parts of hopper cars has been increased four to five years by the use of copper bearing steel instead of the ordinary steel. Tests have shown the value of phosphorus as an alloying element and phosphorus and copper together have been shown to produce in steel greater resistance to atmospheric corrosion than either alone. As a result of the tests, much research work has been stimulated and a number of so-called high-strength steels have been brought out containing appreciable amounts of both copper and phosphorus.

The trend in zinc coatings, as previously mentioned, has been toward heavier and heavier thicknesses. Bethanized wire fence has appeared on the market and general specifications covering not only fencing but nearly all galvanized wire products have been revised to add weight in line with present practice.

Zinc itself, when used as a protection for steel, is subject to corrosion, and to correct this difficulty, the New Jersey Zinc Co. developed its Kronak process. Quoting from the report of this process, "It is now possible largely to eliminate the formation of bulky corrosion products on zinc and to reduce the actual rate of corrosion of the metal. The process involves a simple immersion treatment in an inexpensive acidified sodium dichromate solution. During this immersion, chemical reaction between the zinc and the solution causes the deposition on the surface of the metal of an insoluble film which contains as part of it a sufficient amount of a slightly soluble corrosion-inhibiting material to protect the zinc surface when moisture comes in contact with it. The color of the film varies from a light iridescent greenish-yellow to a deep yellow-brown, depending on the basic metal and the time of immersion."

Preparing Steel

For better preparation of steel prior to painting, Electrogranodizing was developed in 1935, but its application broadened in 1936 and according to a report of the American Chemical Paint Co., which

sponsors it, the process is being used by the Ford Motor Co. for treating tail lamps and hub caps, and by means of new methods of handling, the cost of the process has been reduced. The total cost for chemicals and current is said to be as low as 15c. per 100 sq. ft. of surface treated. One prominent airplane manufacturer has adopted the process for rust-proofing airplane cylinders. Other applications include spark plugs, refrigerator cabinets and nuts and bolts.

For large production work it has been found desirable to form a type of coating similar to Electrogranodizing but which is quicker and more economical. Such a new coating, known as spray-Granodizing, uses the same chemicals but they are applied by high-pressure sprays in a washing machine arrangement instead of by alternating current electrolysis. The spray process forms its coating in less than one minute and produces an effective surface for nearly all applied organic finishes.

The increase in the use of zinc die castings during the past year has been met by the American Chemical Paint Co. with a product known as Lithoform, which is said to prevent paint peeling from all types of zinc and cadmium surfaces. It is also used on galvanized sheets in the mill, so that for the first time in history it is said steel companies are able to supply their jobbers with paint receptive galvanized sheets.

Growing automobile trailer business has brought new metal-finishing applications, particularly in the field of coatings for aluminum. Another recent trend has been the return to soldering as a means of joining members in metal fabrication. This has been possible not only because of improved self-cleaning fluxes, but of methods of concealing soldered joints by proper coatings.

The International Nickel Co. reports the development of equipment for scrubbing steel sheets and the availability of both gas welded and electric welded Monel chain for use in welding equipment. This company also states, "Processes for the continuous electroplating of steel strip now employ nickel for contact rolls and use Monel metal for heaters handling hydrofluoric acid." The report continues, "Another interesting development was the use of nickel clad steel for linings of the holds of fishing trawlers. Three new such trawlers were built during the year with refrigerated holds lined with nickel clad steel for sanitary purposes."

Electrogalvanizing

Ernest H. Lyons, Jr., of the Meaker Co., Chicago, describes a new electrogalvanizing process for round wire. As with previous processes in this field, the preceding cleaning operation is highly important. Mr. Lyons claims to be able to plate uniformly to any reasonable thickness and mentions a thickness of 3 oz. per sq. ft. as having been successfully accomplished. The process operates at very high current density, in some cases up to 1500 amp. per sq. ft.

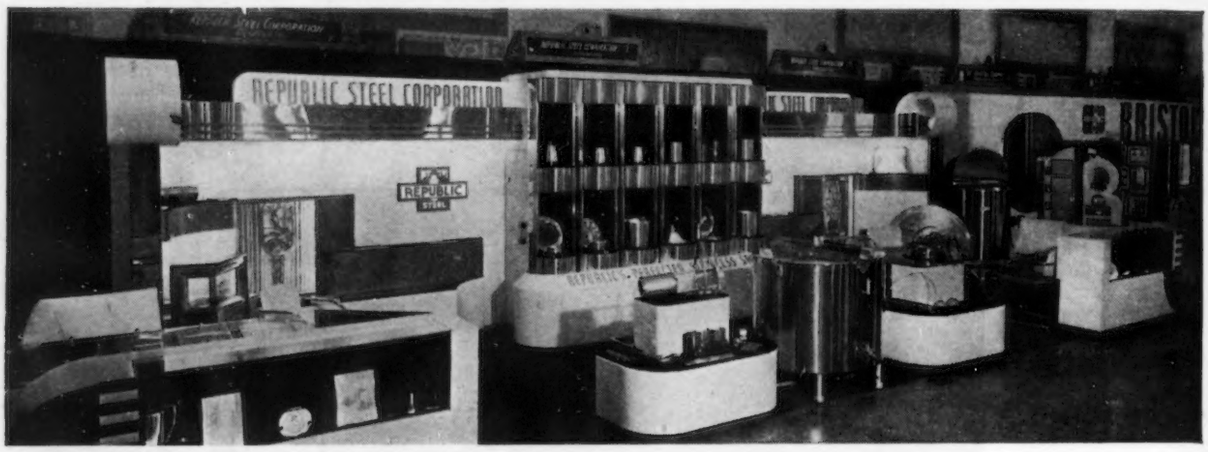
The controversy of long standing between hot dip galvanizers and electrogalvanizers continued through the year with quite positive statements made by the advocates of each process, which occasionally were at variance. The hot dip interests state they are firmly convinced that their process as a protective coating for iron and steel is more practical and economical than electrogalvanizing. On the other hand, the electrogalvanizing camp has been able to show some very striking increases in production and in new equipment.

In an article appearing in IRON AGE, issue of Oct. 22, 1936, detailed figures were given covering the cost of electrogalvanizing 12-gage wire to a deposit of 1 oz. per sq. ft. It was also pointed out in that same article that varying conditions make hot galvanizing advisable in some cases and electrogalvanizing in others.

Among the new showings at the National Metal Congress at Cleveland last fall was a process for surface hardening steel electrically. In this method, known as the Tocco process, low voltage high ampere current passes through inductor blocks surrounding the part to be hardened and close control of surface hardening is claimed.

Case Hardening

A combination process of nitriding and carburizing known as Nicarbing, has been developed by the American Gas Furnace Co. By this means a thin hard case is quickly obtained which it is believed will eliminate the cyanide bath for many purposes. The



DISPLAY companies are turning more and more to bright and colorful metal finishes for decorative effects.

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treatment itself is carried out in a gas atmosphere consisting essentially of a carbon rich gas and ammonia. The apparatus is such that the variables, that is, the mixture of gases, the temperature at the time cycle, can be altered to suit requirements.

The company claims, for products thus treated, a hard surface which is highly resistant to corrosion and oxidation, tight adherence of case to core, reduction in distortion as against similar processes, and low cost both of application and upkeep of equipment. The process has been adopted by a manufacturer of roller bearings, a manufacturer of bolts and nuts and others in the field of stampings, castings and small gears.

An interesting development was a new design of plough which makes it possible to bury telephone wire 18 in. under the ground by a continuous tractor operation; the wire being fed from a spool down through the plough and left buried as the plough passes. This development has been made possible through the discovery of better means of protecting wires against corrosion.

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IN keeping with the interior fittings of the 1937 cars, this electric hand gear shift in the new Hudson uses a zinc die-cast housing with an attractive black baked enamel finish.

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Cleaning

CLEANING is an important part of nearly any metal finishing process and manufacturers of cleaning supplies feel certain that the improvement in cleaning methods has kept pace with the general improvement in other phases of finishing.

The Detroit Rex Products Co. in reviewing developments states, "The new solvent degreasers making use of stabilized safety solvents which are non-inflammable and non-explosive have made available to all metal-finishing industries a simple efficient tool for the cleaning of metal products. The process is adapted to preparation of metal before plating, tinning, galvanizing, enameling and lacquering and is even used before heat treating and pickling. Any combination of the three fundamental methods of applying the solvent to the work to be cleaned, namely, vapor, liquid immersion or hot solvent spray may be incorporated in one machine to apply the new degreasers.

"The particular design of the machine depends upon the requirements of the work, such as thickness of metal, shape of product and quantity. Work comes out of the degreaser dry and clean and ready for subsequent finishing. Our chlorinated solvent may be used over and over, being reclaimed and purified by a simple distillation within the machine itself."

The Magnus Chemical Co., in reviewing metal cleaning progress, says that "The past year has seen a healthy improvement in existing processes rather than the development of anything startlingly new. There has been more extensive application of solvent soaps to metal cleaning, thus combining the solvent action characteristics of vapor or liquid-phase solvent cleaning with the washing action of soap.

Solvents and Soaps

"In general," states the company, "the solvent soaps will do a much more thorough washing job than can be accomplished with either soap washing or solvent degreasing alone. For instance, solvent degreasing will remove oily dirt but leaves behind a solid-particle dirt which often has to be subsequently removed by wiping or brushing.

"On heavily loaded work such as metal surfaces covered with drawing compound, slushing oil or buffing compound, soaps alone are not sufficiently active in their cleaning to remove the dirt load in a reasonable time. Solvent soaps will clean the dirtiest work in a relatively short time, generally less than a 3-min. immersion. These soaps function in the new method which we call emulsion degreasing.

"Low cost is one of the outstanding advantages. Our research in this field has been in the development of soap solvent combinations which give emulsions with a high degree of stability and rapid wetting and penetrating power.

"Progress during the year has been made in the improvement of penetrative properties, emulsibility and rinsibility of what we call pre-cleaning solvents. Progress has also been made in the use of sulphonated oils either with or without sulphonic acids of various types in alkaline metal cleaning compounds in place of soaps and resinates formerly used. The latter, although of good emulsifying properties, have poor rinsibility due to a high degree of absorption on surfaces with which they may be in contact and they suffer the drawback of forming insoluble soaps in contact with lime, magnesium or similar constituents.

"Soaps so formed are of a sticky nature and may produce spots or films. Soaps and resinates also

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THE value of attractive finish exists not only for products but for a multitude of parts, and elements throughout the metal-working industry.

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are decomposed by acid with the liberation of oily films which float to the top of the solution. Such films in metal cleaning can be the cause of much difficulty.

"We have done considerable work with metallic soaps; one for instance, which will clean a steel surface of mineral oil films in 30-sec. immersion whereas previous resin soap cleaners took 3 min. Here again this general line of thought while new is the development of research through several years which has simply been refined and brought to a more efficient working condition during the past year."

Degreasers and Oils

Another company reports greater use of solvents and greatly improved methods for recovery of solvents by distillation. The Dodge division of the Chrysler Corp. installed automatic continuous degreasing equipment with conveyors traveling at 20 ft. per min. and with auxiliary stills reclaiming dirty solvent at the rate of 50 gals. per hr. Some active research work has gone beyond the cleaning operation to study lubricating and cutting oil composition. Complaint has been made that sulphur base cutting oil used in automatic screw machines may discolor Monel metal parts. Such discoloration may be cleaned by dipping the parts in a cold solution of sodium cyanide.

Undoubtedly much of the failure reported in metal finishing may be traced to inadequate or improper surface preparation. A new metasilicate cleaner for metals was produced during the year in the laboratories of the Philadelphia Quartz Co. This cleaner is said to be easily and readily soluble without the need of soaps and resins.

Pickling

Pickling forms an important part of the finishing sequence for many metal products. J. T. Erwin, of the Ferro Enamel Corp., has furnished a report on one phase of progress in pickling. This states in part, "During the past year the use of alternating current for the purpose of speeding up production and reducing costs has found favor in several steel mills for batch pickling. Alternating current pickling methods under our patents fall in general into two classifications, direct contact pickling and indirect contact pickling. In the first, special extruded graphite electrodes are suspended along each side of the pickling tank and connected by means of suitable bus bars running to one side of a low voltage alternating current transformer. The other side of the transformer is connected directly to the basket or crate which carries the work to be pickled. The usual sulphuric acid concentrates and temperatures prevail, except for small additions of our Ferrolyte.

"In indirect contact pickling the graphite electrodes are suspended along both sides of the pickling tank with those on one side connected to one pole of the transformer and those on the other side connected to the other pole. Under this arrangement the work to be pickled becomes, in a sense, another electrode in series with those already in the bath. These methods have been used for pickling forgings for the automotive industry for some time and are now just finding their place in the pickling of sheet steel in the basic steel mills."

The anodic pickling of steel has made considerable progress. In this method the work is made the anode and the surface dissolves with no generation of hydrogen. The rate of pickling is said to be easily controlled through regulation of the current density. A method used in Austria employs auxiliary insoluble anodes with cathodes of steel sheets. It is said by this means there is less base metal loss and the surface is left more resistant to corrosion.

The Bullard-Dunn process of scale removal which the company does not want confused with pickling found extended use during the past year due partly to the development of labor saving equipment. The company has supplied a report on developments which in part is as follows:

Descaling Developments

"There has been a growing recognition in the metal-working industry for the need of descaling. Some makers of furnaces used in steel production and fabrication claim to have eliminated scale or at least to have reduced it to a point where it causes no difficulty. As a result there has been a more definite investigation of the economy of continuing present heat-treating methods combined with a descaling operation after heat treatment as against the installation of the new scale-eliminating furnaces.

"Purchase specifications have begun to call for scale-free heat-treated parts. At the moment, therefore, the whole situation is under active survey because as stated the chief mischief created by even slight traces of scale is now thoroughly recognized.

"We have previously pointed out that our process for descaling removes the scale without damage to the base metal. An important

development of the year was the cleaning of foreign material from certain articles while at the same time leaving these articles at the end of the cleaning treatment, covered with a protective metal film sufficient to retard surface corrosion while such parts are carried in stock or are put through subsequent manufacturing operations. Such a preventative film eliminates the necessity for oiling and thus eliminates also the frequent necessity for subsequent degreasing after such oiling.

"The increase in application of hot tinning calls for a process for proper preparation of the steel used. We feel that our method for removing scale, combined with the simultaneous electrodeposition of pure tin, answers this problem. This tin film, deposited by our process, appears to eliminate the formation of the brittle iron-tin alloy produced when bare steel is plunged into hot tin.

"Our descaling process has been used for cleaning molds such as are used in the rubber industry and in the die-casting industry. These molds are generally made of iron and steel and when cleaned by our process there is no destruction to engraving designs and no lessening of sharpness of the edges of the molds themselves. Usually these molds present a difficult problem of scale removal."

Scale removal by dry blast of grit and air impinging at so slight an angle that it does not injure the surface—a patented process developed by Charles A. Dreisbach—found several practical steel mill applications during the past year. It is intended primarily for removal of hot roll scale on strip and wire.

Equipment and Manufacturing

CLOSER cooperation between the metal fabricator and the manufacturer of equipment is doing much toward improving the production efficiency of finishing operations. It is of increasing importance to have products designed with the finishing process in mind, for almost always a change in design may be made which does not affect the utility of an article but which greatly facilitates finishing.

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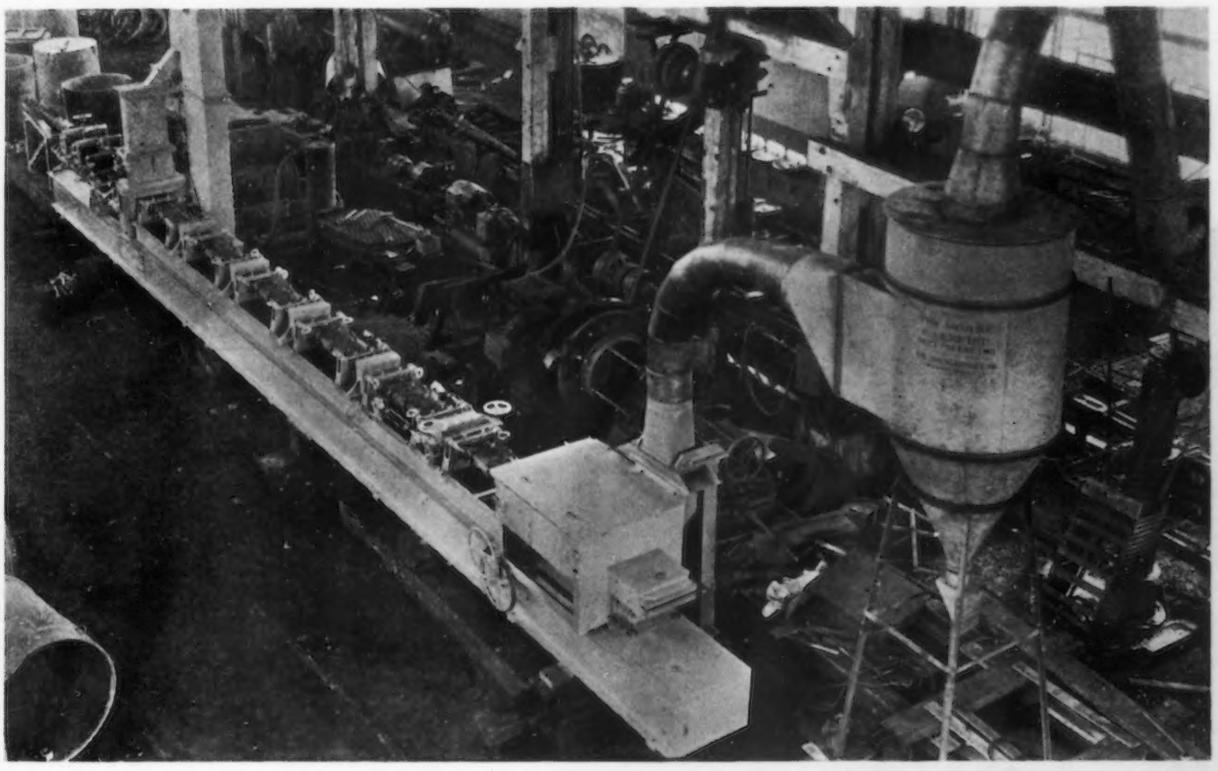
Ampco Metal, Inc., reports a greater appreciation on the part of the public of the finishing characteristics through use of proper dies. Stainless steel is now being formed and drawn largely with hard cast bronze dies and such dies, the company states, are nearly always made of its metal "Ampco." The reason this metal is used is because it does not scratch and yet has long life. Hard cast bronze is said to increase die life from five to ten times that of steel dies between redressing. This is important in mass production such as encountered in the automotive industry.

An improvement in the method of coating abrasive cloth is reported. It appears that through the use of a very high potential electrostatic field (in the neighborhood of 100,000 volts), the small abrasive grains stand on end until held in place by the glue or backing of the cloth and thus give a better product than when spread over in the usual miscellaneous manner.

The American Nickeloid Co. has developed a means of bonding its pre-finished metals to non-metallic backing sheets. The new product is called "Metal Bord" and is finding many applications in industry.

(CONTINUED ON PAGE 52)



THIS is one of the first Drei-Brite process machines to be put in actual production in a steel mill. Scale is removed from strip by tangential blasts of air and grit.

Machine Parts and Tools Produced Rapidly By Continuous Band Sawing and Filing

The accompanying applications of internal and external sawing and filing are shown by courtesy of Continental Machine Specialties, Inc., Minneapolis, whose Do-All toolroom machine was employed for the work described.

AT RIGHT

TABLE of sawing speeds in inches per minute for a number of ferrous metals of various thicknesses.

THICKNESS	Tool Steel	Cold Rolled	Cast Iron	High Speed Steel	High Chrome High Carbon Steel
1/4"	4 3/4"	9"	15 1/2"	2 3/8"	1 1/2"
1/2"	2 1/4"	4"	7 7/16"	1 1/8"	3/4"
1"	1	1 3/4"	3 1/4"	1/2"	3/8"
1 1/2"	5/8"	1 1/8"	2 1/8"	5/16"	1/4"
3"	9/32"	1/2"	1"	5/32"	3/32"
6"	1/8"	1/4"	7/16"	1/16"	1/32"

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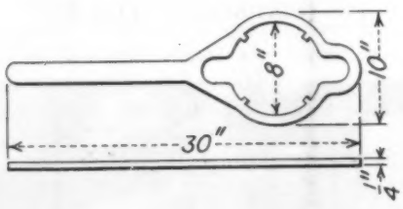
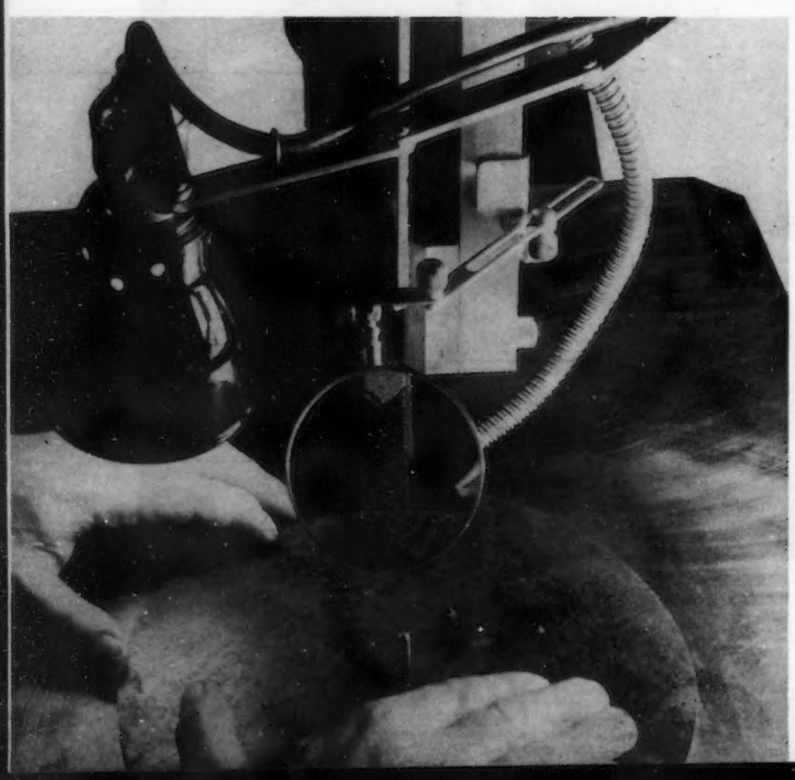
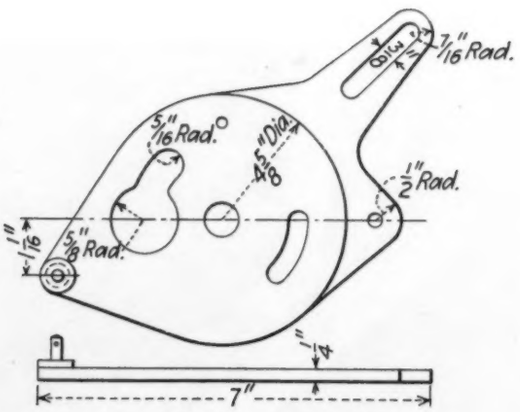
BELOW

THIS wrench is now precision band sawed in 45 min. by Curtis Aeroplane division, Curtis-Wright Corp., Buffalo. Previous methods required 6 hr.







ABOVE

WORK pieces like the above are precision band sawed by the I-T-E Circuit Breaker Co., Philadelphia, at a saving of about 50 per cent in man-hours.

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AT LEFT

THIS disk is rotated around a pin which is adjustable for the radius desired. The file used is graded "flat-coarse" and its velocity is 140 ft. per min. The file band always travels down on the cutting edge so there is no drag back and cutting pressure holds the work on the table.

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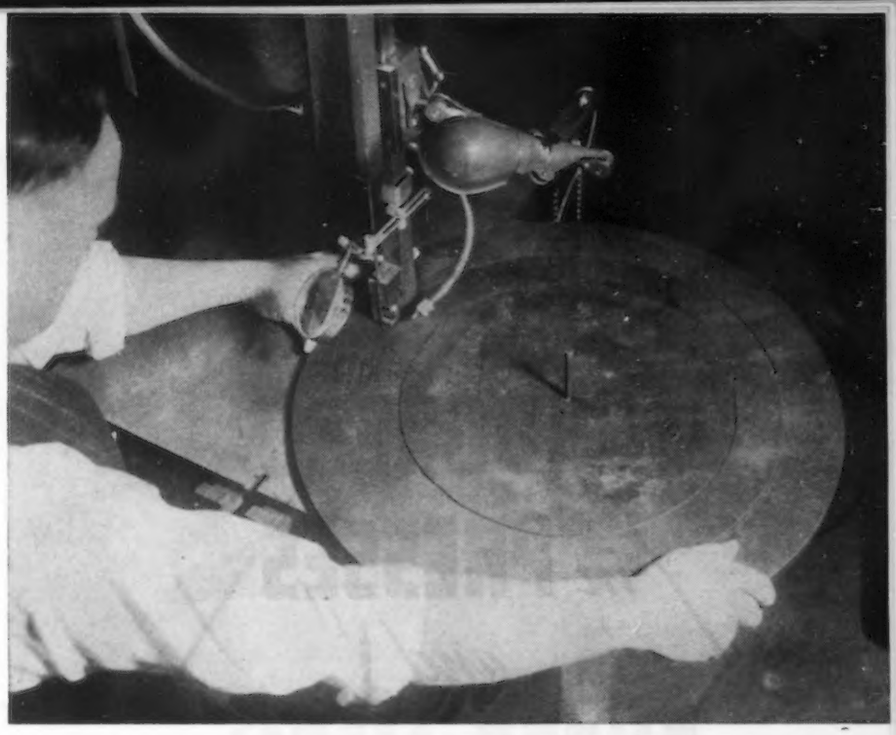
AT RIGHT

SAWING a true circle is accomplished by pivoting a plate on a fixed center. Inside sawing is done by opening the saw band, putting one end through a starting hole and then brazing the saw ends together. The job shown is a 1/2-in. mild steel plate being cut at a rate of 4 in. per min. with saw velocity of 160 ft. per min. The cut is only a 1/16-in. slit. The saw used is 1/4 in. wide, 0.025 gage, 12 pitch, medium hard temper and racker set.



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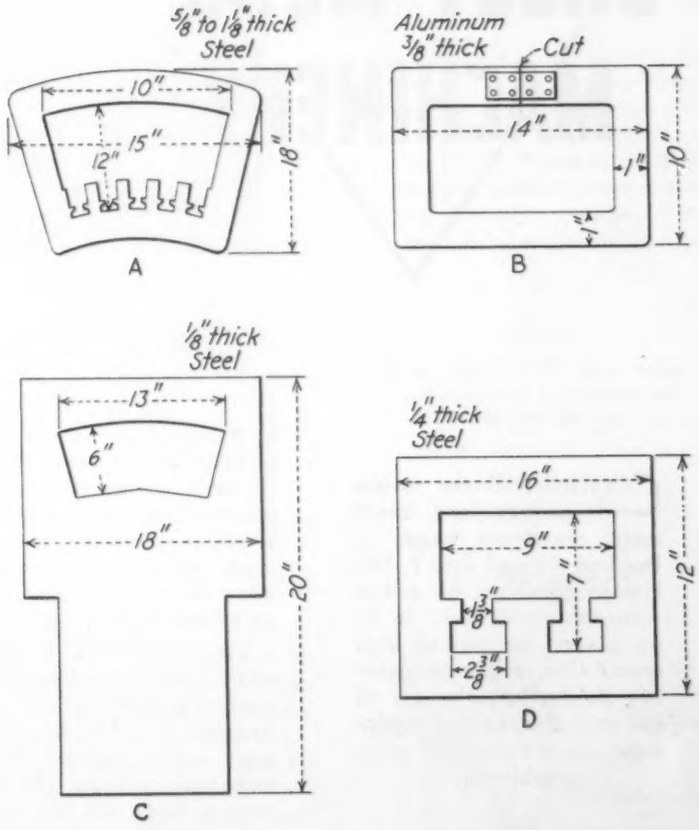
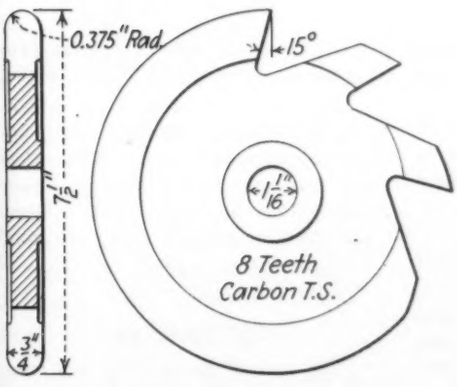
AT RIGHT

AT the right are examples of work being precision band sawed by General Electric Co. Sketch *A* shows an outside stripper for combination and blanking dies. These strip scrap from a punch and accuracy required permits sawing on the layout line and finish with very little filing. An aluminum plate as formerly cut through the rim and patched is shown in sketch *B*. By means of a starting hole and brazed band saw the plates are made without patching. Segmental blank shaped holes (sketch *C*) in automatic feed smoothers for use in connection with segmental combination dies are now sawed. Large shims, sketch *D*, in various thicknesses from 1/8 in. to 1/4 in. are now sawed and filed with considerable saving of time.





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MILLS for cutting slots in gun stocks are sawed by the J. Stevens Arms Co., Chicopee Falls, Mass. Older rough cut methods required 15 1/2 hr. The 24-in. saw cut in 3/4-in. metal is now roughed from the blank in 22 min.

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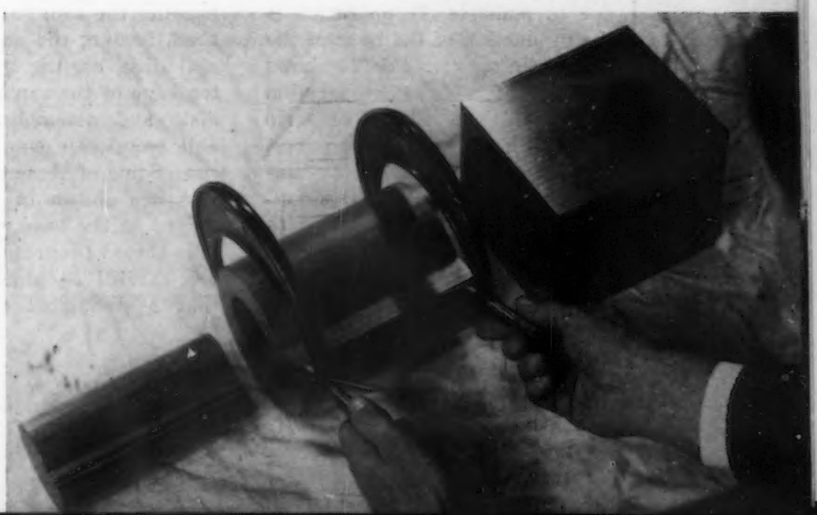
AT RIGHT

THIS special cam, which is 8 in. long, was sawed from mild steel with accuracy end to end of 0.002 in. Saw speed was 125 ft. per min. One 3/8-in. starting hole was drilled for each cut. The outside cut was made in 6 hr. and the inside cut was completed in 4 hr. The saw was 1/4 in. wide, 0.025 gage, 18 pitch, medium temper and racker set.



PROGRESS in PRESSES and SHEET METAL MACHINERY

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By O. P. HATTON

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CONTINUING the review of presses and sheet metal machinery begun in The Iron Age of Jan. 7, Mr. Hatton concludes his article with this instalment. In it, he covers the use of high speed dies, minimum quantity production, the use of low cost dies, control equipment and a number of other subjects.

ILLUSTRATIVE of the speed-up due to multiple die operation is the production of the head of the familiar can opener. Fig. 14 shows the result of a five-die operation through which a ribbon of strip steel of high carbon content passes on a Henry & Wright dieing machine. All five dies stamp simultaneously, and after the fifth stroke the can opener head emerges a completed piece with each succeeding stroke. An even more interesting job because of the utmost possible use of every square inch of metal in the strip, is the progressive die operation required on a similar machine to produce a clock frame member and eight other minor parts simultaneously, as shown in Fig. 15.

Fig. 16 shows a V. & O. press which takes a previously fashioned, simple, cylindrical can body and prepares it to become a "vacuum seal" baking powder can by progressively flanging the bottom to receive later the tin disk which will form the bottom of the can after it has been filled, internally beading the top, flattening the top bead, feeding the parchment paper seal disk, curling and sealing the top edge of the can over this paper disk, and assembling the removable metal cap over the top of the can. Some of these stages of progress are shown in the parts displayed at the base of the machine. All these progressive operations are carried on simultaneously, so that a completed can, ready for filling through the bottom is produced at each stroke of the press.

Fig. 17 shows a V. & O. notching press with indexing table, operating at speeds up to 450 strokes per min., producing electric motor notched laminations. Other types of these machines are available with notching speeds up to 750 strokes per min.

High Speed Dies

The art of die-making has had, of necessity, to progress materially as these new speed records have been posted. Not alone the greater production speeds, but the increasing complexity of operations also has forced the die-maker to greater precision and the search for methods which would yield longer die-life. The metallurgist has provided steels which meet the most arduous requirements, and the die-maker is using more and more mechanical engraving devices in his work. The practice of chromium plating some types of cutting and drawing dies has been

found to give a substantial increase in length of life. Along the line of more or less continuous mass production it will be found that dies of the highest quality in both material and workmanship are required. No expense can be spared, yet at the same time die costs have been materially reduced during the past year in relation to their output life, while precision and durability have been increased.

At the other end of the scale from high speed mass production requirements an equally significant development in die-making has been brought about. Low cost dies are making minimum production quantities less, and thus the range

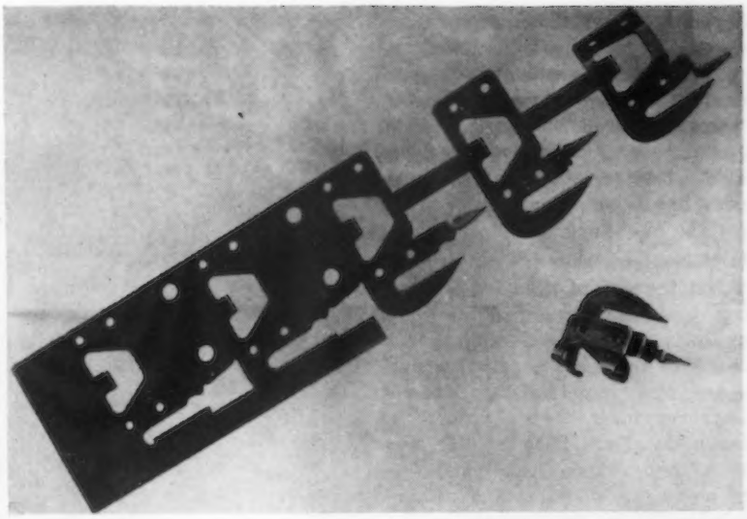

FIG. 14—Progressive transfer die operation stamps out the familiar can opener head.

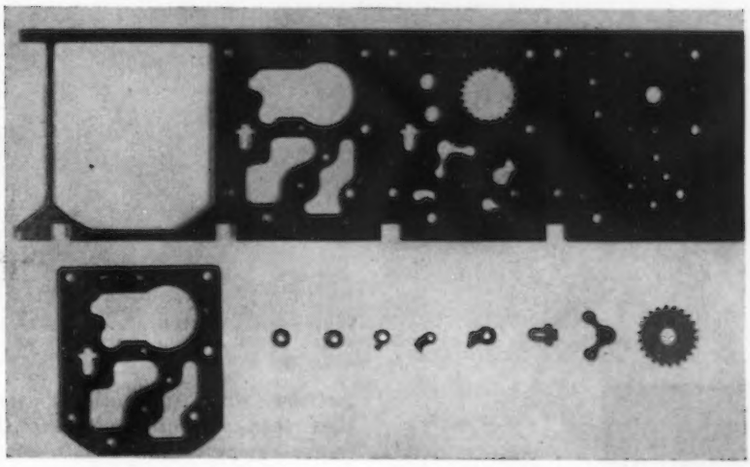

FIG. 15—Clock frame member and eight other parts stamped out simultaneously.

of application of the pressed metal industry technique is being widened. The apparent paradox in this statement requires explanation.

The problem of minimum quantity production has always been one of absorbing the cost of the dies before profits can be taken. With high cost dies, therefore, the minimum quantity of an item required to be produced to balance the cost of the dies has always been high. Usually it has been at least five or ten thousand, and often hundreds of thousands, depending upon the complexity of the work—intricacy of shapes, character and number of operations and dies required, and other variables.

The airplane industry may be credited with furnishing an early stimulus to the transition from a fixed high cost, high production level to one of entirely practical and amazingly small minimums. The more recent developments in high speed, light weight streamlined transportation units are proving to be a second influence of note in reducing die-production costs. In both of these fields, limited numbers of pressed metal parts are essential. Only pressed metal will meet all the requirements. Hence it has been found absolutely necessary to bring die-costs down to the point where these shapes could be produced in limited quantities, economically. The search for means to accomplish this end has resulted in a curious reversion to an old material.

The resourceful and hard-boiled mechanic of the later eighteenth century days took what came handiest in the way of materials, and made it work. There is no doubt but what the earliest power presses had some wooden members. But even the most hard-boiled of these

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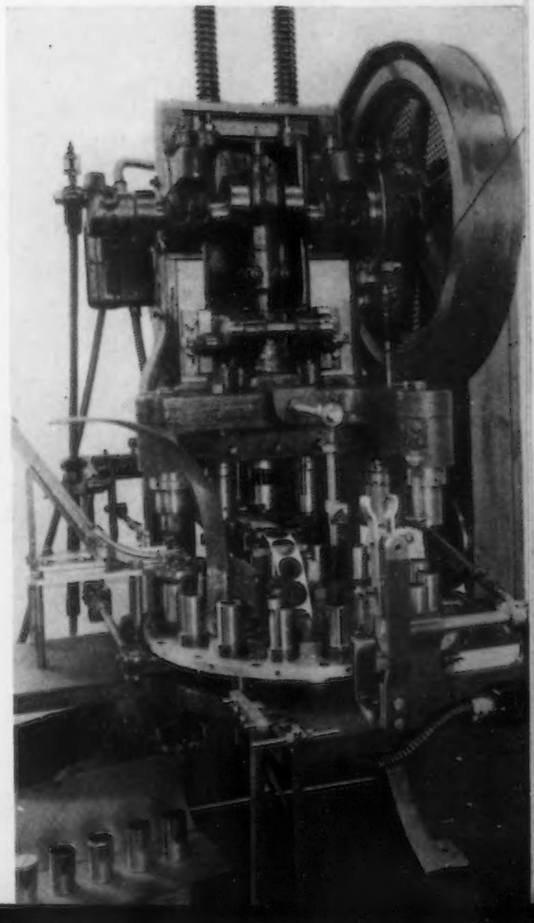
FIG. 16—V & O press makes and assembles a "vacuum seal" baking powder can.



ingenious men never thought of using wood for dies! To them, and to their successors until very recent days, only the hardest metals were fit to use in making, cutting and forming dies, and the development of better steels for this purpose has been an absorbing study for the metallurgist and die-maker alike.

But the urgent need for developing low cost dies for minimum quantity production as well as high cost dies for mass production purposes has spurred the pressed metal engineer to try a hundred materials of startling unlikelihood. Wood and rubber have thus come to assume a distinct field of usefulness in the die-maker's art.

This new practice involves the use of hard wood; sometimes wood to wood, more often wood faced with sheet steel or zinc; hard wood and rubber, or cast zinc (cast either from plaster molds made from patterns, or sometimes molds made from pieces fabricated by hand). Cutting-dies for as few as ten pieces are made in the form of templets of cold-rolled steel, cyanide hardened and mounted on wood blocks. Drawing dies of hard wood (such as maple) with their drawing edges faced with cold rolled steel cost so little in comparison with conventional steel dies that we may soon see the ladies buying exclusive patterns in compacts "of which only fifty were made"—and paying a fancy price for that exclusiveness. The ultimate quantity in pressed metal production has been reached—one dental plate, produced to fit the conformations of the jaws of a single patient. To a very large extent, it has been the modern hydraulic press which has made possible the use of these low-cost dies, because of the flexible adjustment of pressure control which only the hydraulic press gives.

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FIG. 17—V & O notching press notches motor laminations at rate of 450 notches per min.

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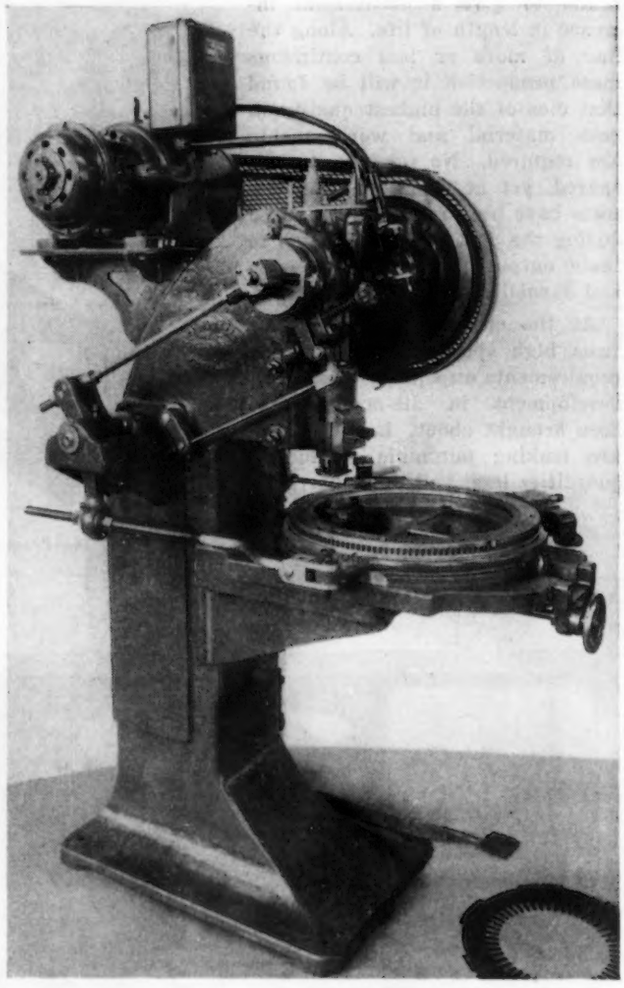

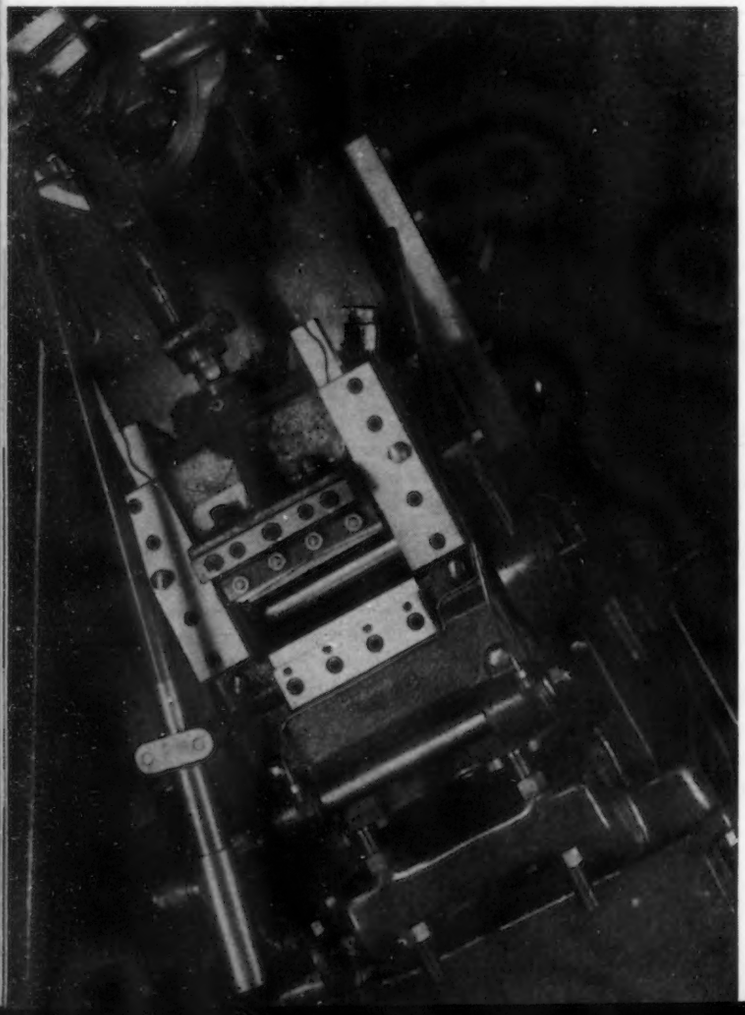

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FIG. 18—Outgoing feed rolls and scrap cutter on modern Bliss high-speed automatic press.

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When the cutting of a small number of blanks by hand costs many dollars each while their production by cheaply made dies can be reduced to, say, ten cents each in lots of one hundred, quite a new field is opened to the pressed metal industry.

What might be called an intermediate stage in the lowering of die costs is presented in the use of alloys suitable for casting into forms so closely approximating

that desired as to leave very little in the way of finishing to be done. Special bronze alloys are now in commercial use with a Brinell rating of 321 to 341, and a tensile strength of 85,000 to 10,000 lb.

In earlier years the extent to which completed parts were produced automatically at each stroke of the press instead of by single operations was limited by the nature of the presses and dies available. While presses and dies of simple type can be used advantageously for single operations, combinations of these operations for simultaneous production on a single press necessitates extreme precision in the press, more accurate and more complicated dies, precision feeding equipment, and fast-acting, precision control equipment. The past decade has seen an amazing development along all these lines, with the past year showing an astounding rate of progress.

FIG. 19—Bliss can tester, automatically tests can for leakage at rate of 300 per min.

BELOW

FIG. 20—Bliss puts a Reeves variable speed transmission on an inclinable type press.

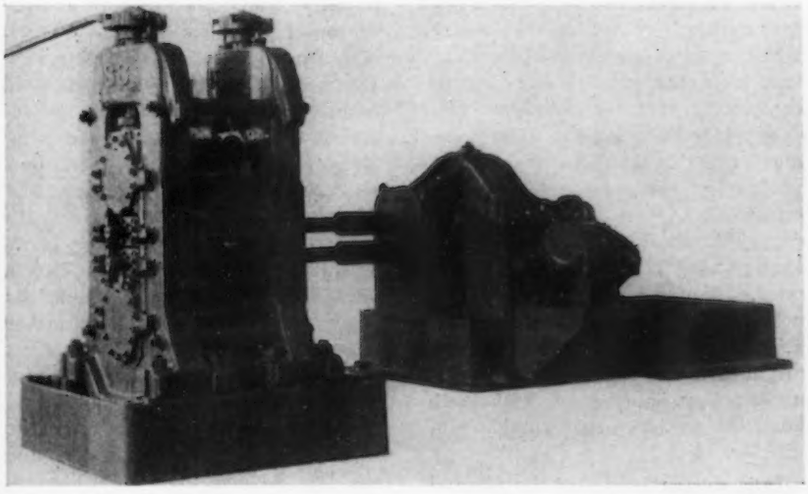


FIG. 21—Bliss four-high strip steel mill of recent design, to take heavy bites.

Such dies are used in the forming and drawing of stainless steel—with very little, if any, sacrifice of the precision or longevity afforded by steel dies.

In particular the development of control equipment deserves comment. The use of pneumatic friction clutches electrically controlled, operated by push buttons, is a recent development found on mechanical presses. On large, heavy work at relatively high speeds, the accuracy of control thus permitted is an essential feature of operation. Automobile type friction clutches have been adapted successfully for lighter, extremely high speed mass production presses. The instantaneous multiple disk friction clutch has been found to run very smoothly at high speeds, with no jolts or jars when engaging or disengaging. As a matter of fact, the usual industrial type clutches have long been found almost useless for high speed press operation, and press engineers

have had to develop finer types for their machines, or quit the race to speed up production rates.

Feeding mechanisms and similar auxiliary equipment have likewise been getting more attention, since a large part of the job of speed-up is dependent upon the accuracy with which the material is fed to or taken away from the presses. An example of such modern auxiliary equipment is shown in Fig. 18, which illustrates the outgoing feed rolls and scrap cutter on a Bliss high speed automatic high production press. The scrap cutter here is built with all the precision of gibbing, blade clearance and connection adjustment of a squaring shear, and is arranged so that the shear blades can be turned over four times and also moved right or left for greater utility. The press is rated at 50 tons and can be operated at speeds up to 300 strokes per min. Reels or cradles have been developed to serve with roll feeds to handle coils of material up to 10 tons or more in weight; and since with such heavy coils the weight of the coil would put a tremendous drag on the roll feed mechanisms, special devices have been developed to advance the material to the roll feeds automatically to relieve the tension of such drag.

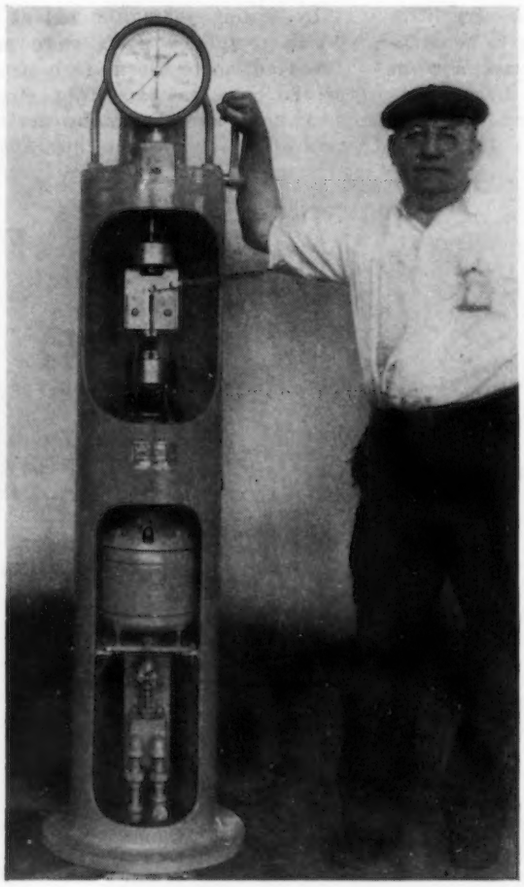
Tremendously increased strength of press construction has been achieved partly by the use of castings of special alloys, and partly by improvements in design. In some of the new presses the factor of safety has been increased 20 per cent or more by such means. One Eastern press manufacturer is using an alloy for frame castings consisting of semi-steel 25 per cent, chromium 2 per cent and nickel 0.1 per cent. The heat treatment of shafts has increased their strength in some cases by 50 per cent. Many of the newer presses show the effect of modern ideas in designing (particularly in the hydraulic types) with a general "smoothing-up" of construction that results in equipment bearing little resemblance to the presses of a decade ago.

Novelties in Pressed Metal

It is worth while to record some of the unusual things in sheet metal production, for each one may be suggestive of some still newer usage and so open another path to unsuspected profits.

Quite the strangest novelty is dummy candies. Chocolate coated candies are notoriously subject to unpleasant changes in appearance when on display due to temperature and atmospheric conditions. An enterprising candy manufacturer supplies his retail distributors with dummy boxes which, when opened, present a most attractive array of very durable and completely weatherproof chocolate drops (top layer only). The "candies" are drawn from sheet steel, portraying the most artistic curlicue work of the expert hand-dipper. The shells are coated with a high-grade, chocolate-colored lacquer. For window display purposes, these dummies are infinitely superior to the real thing. One might ask whether a tooth insurance policy is supplied with each box to protect the inadvertent nibbler.

It is characteristic of the pressed metal industry that it is impossible to predict just what it is going to pounce upon and take unto itself in a proprietary way. Two hundred-ton hydraulic presses are today in use in dental laboratories for the production of sheet metal dental plates in lots of one only.



AT LEFT

FIG. 22—Baldwin-Southwark portable hydraulic sheet-weld testing equipment.

o o o

AT RIGHT

FIG. 23—General Machinery Corp. Hamilton lower-drive type of heavy forming press.

If the reader has come lately to the ministrations of an up-to-date dentist he may be carrying in his mouth one of the newest evidences of the ubiquitous nature of the industry. An impression of the patient's mouth is taken in a plastic material which, when processed, acquires a sufficiently high resistance to heat to become a solid mold, in which is cast a special metal alloy—the casting becoming one of the necessary pair of dies. By a similar process a counter die is fabricated, and the pair, with the aid of hydraulic pressure, turns a sheet of stainless steel into a most serviceable base to which the teeth are affixed. It is of minor consequence that the process is still a bit in the experimental stage; that the palette or central portion is made separate from the ridge representing the gums, and the two welded together. The industry has *its* teeth in the problem, and will solve it. Incidentally this is the perfect antithesis of the mass production methods to which the industry lends its greatest support.

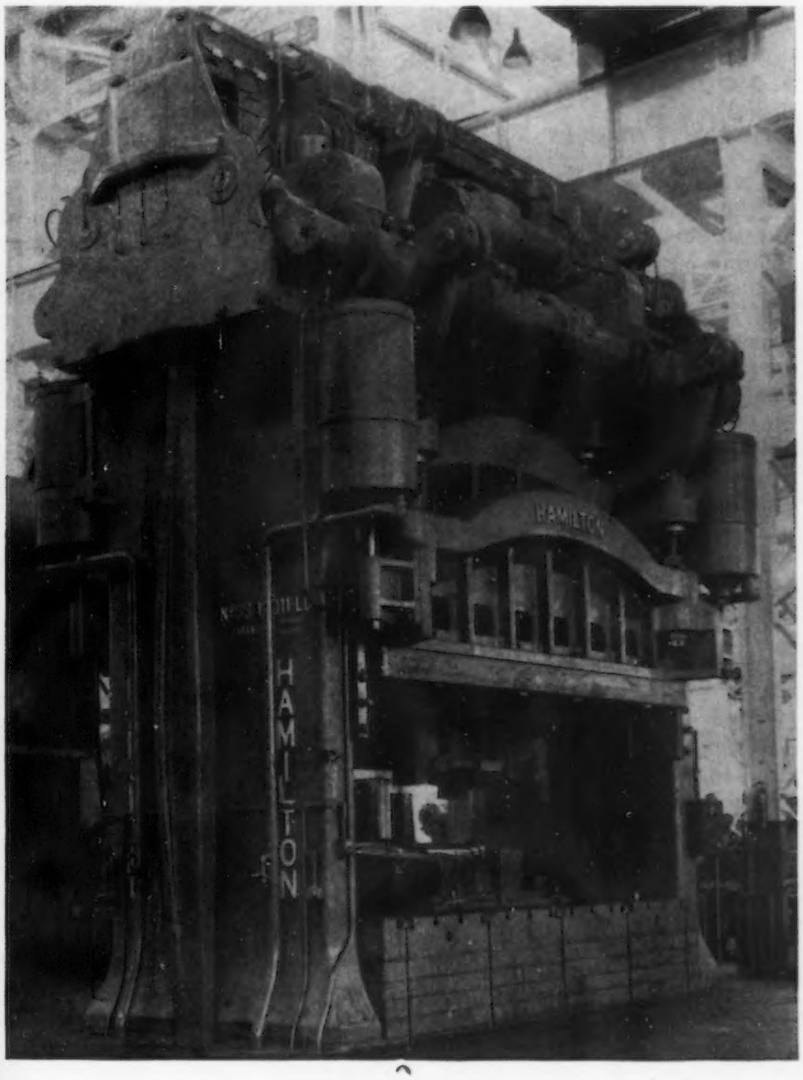
The technique of pressed metal production has been borrowed very successfully by a score of unre-

lated fields of industry. The development of higher operating speeds, together with improved flexibility of control, in the hydraulic type of press has provided the means for the greater variety of uses, although mechanical equipment also functions outside its original sphere.

Of all such extraneous usage, the most rapid advance has been made in the new field of plastics. Practically all plastic molding falls to the lot of the hydraulic press, which in its modern form now presents the option of fully controllable dwell and follow-up, combined with rapid action in the non-working parts of the stroke. When one views the tremendous variety of plastic molded articles now produced, and the wide range of uses to which they are put, it is interesting to speculate upon the possibility that they may some day equal or out-number the wholly uncountable host of things that go to make up the products of the pressed metal industry. The molding of items of electrical insulation originally provided the principal objective in this development, but today the family of plastic products in both the necessity and luxury categories has far outrun the ability of the industrial census-taker to follow. Perhaps a single item will illustrate the rabbit-like capacity for producing new offspring that is characteristic of this new industry; it is now providing the fair sex with the most fetching and adorable hats of molded felt.

Veneers and plywoods call upon the hydraulic press more and more urgently for economical production processes. The power transmission industry finds the recent developments in flexibility of speed and load control of hydraulic presses an important factor in the production of both leather and rubber belting. Briquetting of feeds, waste coal, dry ice, abrasive wheels, carbon, soap, etc., make up other fields into which the hydraulic press is bringing that higher degree of efficiency and economy that is consonant with present rates of technical progress.

The past year has seen an improvement in the adaptability of the hydraulic press to the baling of sheet metal scrap. And, of course, it is a most necessary implement in the rebaling of compressible commodities for shipment, reducing the cubical content for more economical transportation requirements.



Developments in the East

The pressed metal industry is really made up of three diverse factors. One is the equipment manufacturer, and it is really his story which has been told so far. Another is the industrial user of pressed metal equipment, the plant in which such equipment is used as the means, or one of the means of manufacturing a product. In this category come such manufacturers as those who make their own trade-marked commodities, as automobiles, baking-pans, clocks, dairy machinery, electrical fixtures, and so on throughout the alphabet to xylophones. The third factor is a hybrid—the contract manufacturer who produces pressed metal items or parts on order for other people to use in their businesses. His is a plant that specializes in pressed metal production. His output may vary from day to day and from month to month. All three of these factors must be considered in evaluating the situation in the pressed metal industry as a whole today.

In the East the main interest centers in New England, where the production of small pressed metal items gave the original, and continues the present, impetus toward high-speed mass production methods. Here both industrial user and contract manufacturer flourish. As recovery obliterates the scars of depression, we find both these factors pressing forward and making vocal their demands for high-speed, more accurate, mass production equipment, stimulating the equipment manufacturers (who are mostly outside of New England proper) to ever fresh efforts of design and construction. Bridgeport, New Haven, Hartford and Worcester are live centers of pressed metal production today.

(CONTINUED ON PAGE 104)

Review of Progress in Metal Finishing

(CONTINUED FROM PAGE 43)

The Detroit Rex Products Co. brought out several new models in degreasers. Special features include a two-strand cross-rod type of conveyor with variable speed drive, roller type gravity conveyors at each end of the machine, electro immersion heaters and thermostatically controlled magnetic relay and line switch. The machines are also equipped with full automatic vapor level control devices.

Other new degreasing machines are reported by C. S. Blakeslee & Co. Features of some of these include an arrangement for pumping solvent to either side of the machine or directly to the storage tank when necessary. The solvent used is a chlorinated hydro-carbon known as Blacosolv.

A typical cleaning cycle reported for some degreasers is first, immersion in boiling solvent; second, rinse in clean solvent distillate, and finally, immersion in pure solvent vapors.

Modern machines are completely hooded and self-contained so that they may be easily used in a standard production line. The Bullard Co. states that its new automatic descaling machine is operated by means of a time clock or by push buttons at the choice of the operator.

In the field of polishing, the Lee Mfg. Co. has brought out a string buffing brush. The report of the company states that when the work is drawn back against the direction of the rotation of the brush, the string wheel gives a finish which is comparable to pumice and water finish. It is said to be adapted also to finishing aluminum and to give a Butler finish on silver.

Other equipment developments of the year include new types of baking ovens combining spraying and baking in one operation, and a tunnel oven with slot conveyor for drying lacquered steel sheets.

T. F. Philippi, of the Excelsior Tool & Machine Co., tells of four machines which his company developed during 1936. These were for polishing and grinding electric iron base castings, for polishing stainless steel sheets with paper abrasive belts, for automatically polishing automobile bumpers, and for grinding and polishing stove tops to a high lustre.

The Leon J. Barrett Co. gives as its outstanding achievement for 1936 the development of a centrifugal machine for coating metal articles with lacquers, enamels, and molten metals such as tin and zinc. In these machines the work is placed loosely in the container, the finishing materials are then allowed to cover them completely, after which the machine is closed and spinning starts. The centrifugal action removes all the coat material except the thin film adhering closely to the surfaces of the articles. The articles are then baked if the material is such that it is not dry when products are removed from the machine. The procedure is said to be simple and the finish uniform.

Coloring and Special Finishes

AN interesting new process which is about to be introduced by United Chromium, Inc., is that for coloring metal articles. This process, which is covered by patents and patent applications, makes it possible to obtain electrolytically surface coatings of great brilliance and of almost any desired color or shade. It can be applied on articles of various types and descriptions and on nearly all base metals.

The process has the advantages of moderate cost of installation and operation, and great throwing power contributes to its flexibility and ease of handling. The trademark "Electrocolor" which is used in connection with articles colored by this process has been registered in the U. S. Patent Office.

It is expected that a public announcement will be made in the not too distant future of the basis upon which this process will be made available to users throughout the country.

In addition to the above process at least a score of important new coloring processes were developed during 1936. Many of these were described in a series of articles appearing in THE IRON AGE under the heading, "Coloring of Metals," and the metal-working industry in general during the year became more conscious of the value and use of color in the design of its products than ever before.

A machine was developed for scientifically determining and matching colors and Howard Ketchum brought to a completion a color code by means of which new shades could be sent by cable from Paris to New York, for instance.

Experimental work was started, and bids fair to succeed, on the problem of coloring linotype metal in the melting pot. It is claimed this will greatly increase the salvage value of the metal because of its adaptability for toys and novelties.

The use of color is closely associated with finishing technique, for it is first necessary to produce a color in the medium desired before it can be incorporated in design. The O. Hommel Co. announced in 1935 the development of a new process giving a greater variety of color and better bond between the porcelain enamel and the base metal. This process was extended during 1936 and is said to lend itself to the use of gay pastel shades as it consists essentially of bonding white frit to steel sheets in a one-coat enamel. The company's report on 1936 developments gives as one of the most important the increasingly wide use of one-coat white porcelain enamels. The report states: "The new one-coat white enamels give with a normal application a covering power equivalent to the ordinary two-coat ware, thus reducing the enameling cost by approximately one-third. The finish is more resistant to mechanical and thermal shock by virtue of the thin coat. For practical reasons one coat of porcelain enamel cannot be applied to a greater thickness than 40 grams per sq. ft. and for usual two-coat work, each coat is 30 to 35 grams per sq. ft. For reflectance of 70 per cent on high-grade ware, 60 grams per sq. ft. to two coats are required of ordinary enamel, while for the super opaque enamel, an application of 35 grams per sq. ft. gives the same results or even a little better."

Another development in porcelain enamels is an acid-resisting and stain-proof coating for cooking utensils.

Exports Decline Slightly — Imports Higher

Exports (In Gross Tons)	November		Eleven Months Ended November	
	1936	1935	1936	1935
Pig iron	289	352	2,225	3,041
Ferromanganese and spiegeleisen	9	42	453	131
Other ferroalloys[5]	107	....	2,104	....
Iron and steel scrap	69,113	104,961	1,778,685	1,902,371
Tin plate scrap	780	2,761	13,827	32,255
Waste-waste tin plate	6,149	2,420	39,493	20,953
Pig iron, ferroalloys and scrap	76,447	110,536	1,836,787	1,953,751
Ingots, blooms, billets, sheet bars	2,773	2,246	19,041	39,050
Skelp	16,549	15,642	65,789	61,131
Wire rods	3,493	1,796	33,405	23,147
Semi-finished steel	*22,815*	*19,684*	*118,235*	*123,328*
Bars, concrete reinforcement[5]	135	....	2,871	....
Bars, other steel	4,253	4,223	46,283	51,453
Iron bars	52	129	956	1,050
Plates, iron and steel	11,482	4,573	76,940	40,188
Sheets, galvanized steel	6,932	5,855	55,205	65,265
Sheets, galvanized iron	159	162	1,509	1,794
Sheets, black steel	17,347	9,592	129,668	92,812
Sheets, black iron	704	412	6,654	5,090
Hoops, bands, strip steel	6,006	4,270	56,691	41,254
Tin plate and taggers' tin	20,577	13,330	211,223	113,353
Terne plate (including long terne)	256	149	2,992	2,132
Structural shapes, plain material	4,968	4,089	54,802	32,577
Structural material, fabricated	2,118	1,031	23,944	18,788
Sheet piling	92	....	2,775	....
Tanks, steel	908	1,584	19,780	6,667
Steel rails	7,381	4,999	68,820	44,552
Rail fastenings, switches, spikes, etc.	1,044	865	11,873	8,939
Boiler tubes	726	505	6,771	8,112
Casing and oil line pipe	4,953	814	27,205	24,585
Pipe, black and galvanized, welded steel	1,931	2,067	17,815	30,486
Pipe, black and galvanized, welded iron	156	221	3,524	2,975
Plain wire	3,635	3,383	41,969	35,883
Barbed wire and woven wire fencing	2,484	2,993	31,502	30,732
Wire cloth and screening	104	60	1,011	938
Wire rope	246	480	2,964	3,780
Wire nails	337	1,100	6,909	10,085
Other nails and tacks	225	292	2,916	3,405
Other wire and manufactures	363	508	4,427	4,824
Bolts, nuts, rivets and washers except track	598	503	6,030	5,891
Other finished steel	172	135	1,971	1,355
Rolled and finished steel	100,344	68,324	927,800	688,965
Cast iron pipe and fittings	2,004	1,911	17,506	17,001
Malleable iron screwed fittings	288	227	3,277	3,183
Carwheels and axles	661	2,156	7,147	16,268
Iron castings	402	966	6,330	8,486
Steel castings	161	251	2,974	2,550
Forgings	175	783	3,446	5,804
Castings and forgings	*3,691*	*6,294*	*40,680*	*53,292*
Total	203,297	204,838	2,923,502	2,824,336

Imports (In Gross Tons)	November		Eleven Months Ended November	
	1936	1935	1936	1935
Pig iron	10,615	15,550	155,486	114,648
Sponge iron	305	195	1,895	1,284
Ferromanganese[1]	4,684	....	26,721	....
Spiegeleisen	12,819	8,153	48,158	49,821
Ferrochrome[2]	15	10	46	11
Ferrosilicon[3]	23	78	476	683
Other ferroalloys[4]	....	....	526	1
Scrap	12,504	15,392	128,175	53,763
Pig iron, ferroalloys and scrap	*40,965*	*39,378*	*361,483*	*220,211*
Steel ingots, blooms, etc.	....	83	83	2,045
Billets, whether solid or hollow[5]	173	....	895	....
Wire rods	1,222	2,612	17,525	15,494
Semi-finished steel	*1,395*	*2,695*	*18,503*	*17,539*
Concrete reinforcement bars	101	166	3,515	2,746
Hollow steel bars	28	88	1,805	1,089
Merchant steel bars	3,705	2,147	36,936	22,191
Iron slabs	14	....	14	....
Iron bars	175	56	1,347	1,374
Boiler and other plate	....	54	421	541
Sheets, skelp and saw plate	1,580	541	21,120	10,002
Die blocks or blanks, etc.[5]	3	....	177	....
Tin plate	7	8	188	182
Structural shapes	5,817	3,828	53,769	35,983
Sheet piling	183	....	2,512	225
Rails and track material	338	762	7,170	4,955
Welded pipe	67	396	5,170	4,253
Other pipe	2,902	431	27,936	14,110
*Cotton ties	10	....	*1,680	*8,136
*Hoops and bands for baling	2,365	1,597	*22,345	*20,306
Barbed wire	480	1,486	13,708	22,754
Round iron and steel wire	437	253	4,545	3,587
Telegraph and telephone wire	1	15	38	38
Flat wire and steel strips	214	204	2,597	1,696
Wire rope and strand	171	281	2,241	1,863
Other wire	49	120	1,783	1,215
Nails, tacks and staples	531	1,883	20,248	19,205
Bolts, nuts and rivets	68	35	493	274
Horse and mule shoes	5	43	365	552
Rolled and finished steel	*19,261*	*14,394*	*232,123*	*177,277*
Malleable iron pipe fittings	1	....	167	46
Cast iron pipe and fittings	127	46	703	76
Castings and forgings	221	124	1,275	1,188
Total	61,970	56,637	614,254	416,337

*Corrected figure.

[1] Manganese Content. [2] Chrome Content. [3] Silicon Content. [4] Alloy Content. [5] New classes. No comparable figures for previous year.

EXPORTS of iron and steel products, excluding scrap, during November totaled 125,995 gross tons, valued at $8,648,974, compared with 94,696 tons, valued at $5,966,137, in the corresponding month last year, according to the Metals and Minerals Division, Department of Commerce. The November trade marked the second highest monthly volume since August, 1930, being exceeded by 7.7 per cent by the October, 1936, trade.

Tin plate continued as the leading item of exportation, amounting to 20,577 tons, valued at $2,079,005; black steel sheets was another outstanding item, totaling 17,347 tons, valued at $1,270,031.

Exports for the first 11 months of 1936 showed sharp gains both in quantity and value when compared with the similar period in 1935, exports, excluding scrap, in 1936 aggregating 1,090,237 tons, valued at $78,063,632, compared with 868,757 tons, valued at $58,966,726 in 1935.

Imports of iron and steel products, excluding scrap, aggregated 49,466 gross tons and represented the third highest monthly volume received during the first 11 months of 1936. Reflecting the continued gain being registered in domestic steel mill activity, the outstanding products in the November import trade were for the most part raw materials or those for further processing.

November Imports of Iron and Manganese Ores

(In Gross Tons)

	Iron Ore		Manganese Concentrates, 35 Per Cent or Over	
	1936	1935	1936	1935
Canada	60	60	....	....
Cuba	54,500	....	3,250	....
Chile	107,700	108,725	....	....
Spain	....	413	....	....
Norway	7,018	8,864	....	....
Sweden	28,481	14,911	....	....
French Africa	6,250	5,700	....	....
Russia	....	8,050	11,748	1,833
India	....	....	6,423	4,975
Brazil	....	....	7,313	1,804
Gold Coast	....	....	3,049	6,092
Other Countries	363	11,121	....	65
Total	204,372	157,844	36,783	14,769

November Imports of Pig Iron by Countries of Origin

(In Gross Tons)

	November		Eleven Months Ended November	
	1936	1935	1936	1935
United Kingdom	....	100	5,286	13,825
British India	2,738	3,845	50,777	31,458
Germany	....	156	4,549	3,427
Netherlands	4,147	9,782	58,465	41,097
Canada	648	1,188	10,304	13,077
France	....	....	....	50
Belgium	....	....	973	100
Norway	129	169	2,549	2,395
Sweden	....	260	589	907
Russia	2,953	....	21,448	7,408
All others	....	50	446	904
Total	10,615	15,550	155,486	114,648

THIS WEEK ON THE ASSEMBLY LINE

. . . Production of 484,000 units makes December the second-highest month of 1936.

o o o

. . . General Motors December production of 239,-114 cars and trucks topped all previous records, just on the eve of nation-wide shutdown due to strikes.

o o o

. . . GM strike situation deadlocked, with both sides taking strong stands on fateful issues.

o o o

. . . Washington intervention seen as only means of bringing permanent solution as efforts of Governor Murphy fail to budge either party.

DETROIT, Jan. 11.—By the end of last week production of the entire General Motors Corp. had virtually come to a standstill just at a time when the corporation announced the largest production of cars in the previous month for any in its history. In December 239,114 cars and trucks were manufactured in the United States and Canada. This compares with 185,698 in December, 1935. Production for the full year in 1936 went to 2,036,690 units from 1,715,688 the previous year and 1,899,267 for 1929, the former record year.

Total December production of members of the Automobile Manufacturers' Association was 389,382 units. Adding an estimated 95,000 for Ford production brings the total for the month to 484,000 units. The 1936 high was 527,728 in April. Chevrolet's production for December was 128,253 and the total for the year is 1,275,006, almost 100,000 units over the 1929 total. Other General Motors units report record production and sales for December. Before the Buick assembly line at Flint shut down, it was turning out 1350 cars a day, a record volume for this plant and domestic sales of Buicks in December stood at 23,550, 81 per cent over the volume recorded in December a year ago.

What production for the industry may be in January is anybody's guess. Automotive output for the week ended Jan. 9 increased 16 per cent over the previous week, which was a short one due to the New Year holiday. Ward's Automotive Reports estimates production of 92,142 passenger cars and trucks in the United States and Canada, compared with 79,538 for the week ended Jan. 2. Ford's production was practically back to normal and the Chrysler volume was at a new high for 1937 assemblies. This current week General Motors assemblies are likely to reach the vanishing point due to the curtailment of parts and strikes within Fisher Body units. Both Ford and Chrysler are pressing steel companies and parts makers for delivery on supplies and apparently intend to fabricate as many cars as they can before they are affected by glass shortages. Both these concerns have received shipments from abroad and from Canada that will help sustain operations. Ford's glass-making capacity at Rouge will supply approximately one-third of its total assemblies, which places this company in a very advantageous position.

On the other hand, news from Toledo indicates that Ralph Lind, who has been appointed by the Department of Labor to negotiate the plate glass strike, may succeed in getting the Flat Glass Workers Union to withdraw their demand for an out-and-out closed shop and the check-off, which so far has blocked negotiations.

Briggs Has Another Strike

Ford's production of Lincoln-Zephyr cars was temporarily affected by a short sit-down strike at the Meldrum Avenue plant of

Briggs Mfg. Co. last week. A large force of uniformed special police went into the plant Thursday night and forcibly ejected the strikers and the plant was enabled to reopen the following Monday, although picketed. This is not the first time that Briggs has been affected by a sit-down strike, but has managed to stave off a shutdown by quick settlement with the group or by fast action in running the ringleaders out of the plant before a sit-down became effective. This strategy in combating the sit-down technic has worked successfully in several other plants in Detroit and may be attributed to the fact that none of the plants in which ringleaders were hurriedly and forcibly ejected had any real strength as far as the United Automobile Workers are concerned—that and the fact that the UAW is concentrating all its strength on the drive against General Motors.

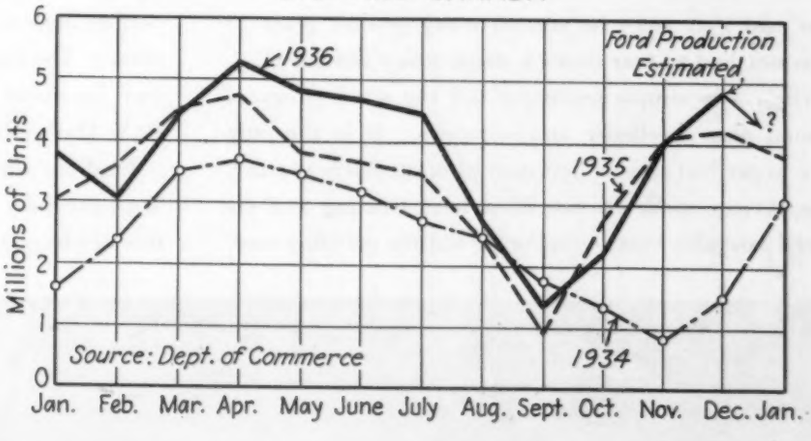
General Motors is not only the focal point of the UAW drive, but also of John L. Lewis and his Committee for Industrial Organization. John Brophy, director of the CIO, and Philip Murray, chairman of the Steel Workers Organizing Committee, along with other high officials of the CIO, have been in Detroit for the past week helping Homer Martin direct the UAW strategy against General Motors. The very fact that this concentration of strength is being made by the CIO indicates that the outcome of the General Motors showdown may decide the fate of the CIO. It is fairly obvious that the drive in the steel industry has been temporarily sidetracked until the automobile issue is cleared up. For this reason it is believed that the UAW will put up a strong fight against General Motors, since to back down at this time would mean a tremendous loss in prestige among the workers whom they are trying to organize.

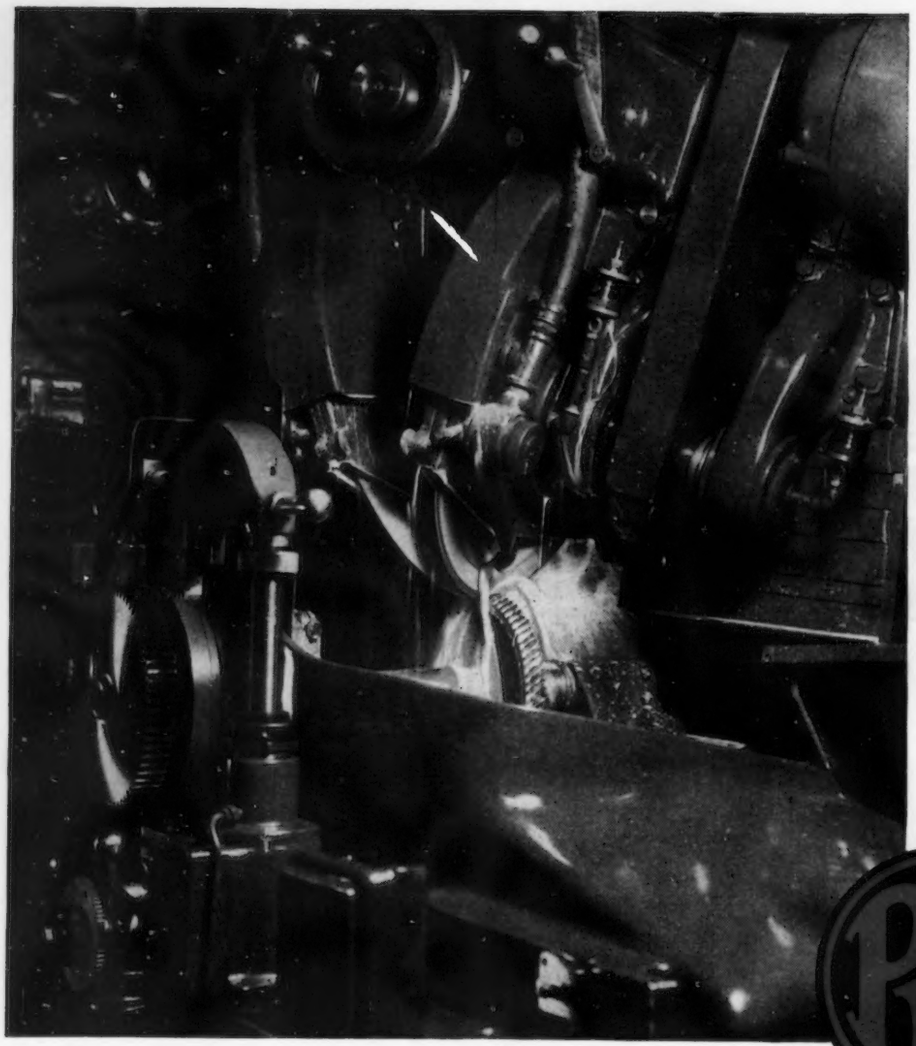
There is every reason to believe the UAW will not back down at this time. In a press conference last week, Mr. Martin appeared confident, self-assured and cocky. "Tell the automobile workers that we will not sell their birthright for a mess of pottage—this mess of collective bargaining," was his challenge. He indicated that the rank and file of labor in the United States is behind his group, that the Detroit, Wayne County and Michigan Federations of Labor (A.F. of L. affiliates) are backing the General Motors strike; also that the membership of the craft unions in Cleveland were behind them, despite protest telegrams sent to General Motors by officials of national A.F. of L. officers.

Negotiations in Stalemate

After a week of effort, Governor Murphy and Federal investigators released letters on Sunday summarizing the frozen position of each side. The issue has boiled down to this: Under what conditions will sit-down workers withdraw from General Motors plants? Through intermediaries both sides have given ground considerably. It has been fairly evident that General Motors could never afford to accept UAW or any other union as the sole collective bargaining agency. It now turns out that this point, as well as all others, was offered by the union as a "basis for negotiation." On the other hand, Mr. Knudsen now expresses

TOTAL PRODUCTION OF PASSENGER CARS AND TRUCKS
U.S. AND CANADA





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That statement is from a letter written by a man who recently bought a P&W Hydraulic Gear Grinder. He also said that since he started using ground gears he "has not had to tear down a single noisy assembly".

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his willingness to bargain collectively with UAW on matters of general corporate policy and if and when strikers evacuate plants.

Considering strong statements made by Alfred P. Sloan, Jr., last week, indicating that matters of national policy were not subject to bargaining, there was plenty of face saving for the union in Knudsen's statement. The conditions under which the UAW would be withdrawn from the plants were phrased in a manner somewhat like the question, "Are you still beating your wife?"

The union wants a written guarantee of good faith, stoppage of coercion, circulation of petitions and organizing of vigilante activities, as well as "proper safeguards," such as non-resumption of activities and no movement of machinery until settlement is effected. The union recognition is asked for, but not as a sole bargaining agency. To accept any of these conditions would be tacit admission of the practice of questionable activities on the part of the corporation. Mr. Knudsen interprets their acceptance as condoning illegal occupation of plants, a gesture which the corporation flatly refuses to make.

There is every indication that the issue will have to be settled in Washington by President Roosevelt. A definite declaration of policy toward the sit-down strike is in order if industry is not to be beset by this evil indefinitely and if minority groups are not to assume dictatorial roles. Obviously the situation is surcharged with political implications not only relating to the present administration but also to John L. Lewis and the formation of a labor party by 1940.

Union Strength Uncertain

It is difficult to estimate at the present time just how strong the United Automobile Workers are, particularly in General Motors plants. It is readily conceded that the UAW has the Dodge plant and the Chrysler Corp. very well organized. It is also reliably reported that Chrysler has avoided a trial of strength with the union largely by acceding to most of its demands as they came up from time to time through the Works Council, so-called company union that is actually dominated by representatives of UAW. If plants of the General Motors Corp. were organized equally as well, it is doubtful whether the present crisis would have occurred. It is an old A. F. of L. adage that it takes only 5 per cent of the workers to call a strike and 15 per cent to hold it. General Motors officials have every reason to believe that UAW representation in their plants is small. Already, workers at the Chevrolet plants in Flint, Saginaw, Detroit and Baltimore have indicated in petitions to the management that the vast majority of the workers are not in favor of a strike and wish to continue work. About 8000 of the 12,000 Buick workers sent a round robin letter to their president, Harlow H. Curtice, last week, indicating their loyalty and their desire to continue work. In fact, trouble is looked for very shortly in the city of Flint between the sit-down strikers and the much larger force of unorganized workers who resent the loss of pay during this critical period. The sheriff of Genesee County could not muster enough deputies to eject the strikers from the two Fisher Body plants in Flint on the strength of a very broad injunction, but it may be before the week is out that the unorganized group may take matters into their own hands. After all, as it stands now, a main issue with General Motors is that sit-down strikers first leave the plant before further negotiations proceed.

Perhaps the greatest fear is that if the union gains any ground at the present time, even though their demands for sole recognition are rejected, it may still build up their strength by a so-called victory to a point where such demands would be pressed again at an early date, with the ultimate objective of demanding the closed shop and perhaps even the check-off. While union officials deny that such are their plans, such assurances are accepted with skepticism. The automobile industry's entire record of recovery has largely depended upon its independence of action and its strong competitive spirit between manufacturers. If the throttling grip of a strong union were ever placed around the industry, it would tend to stagnate progress, particularly in the direction of giving increased value with decreased cost from year to year. The efficiency of the modern machine would undoubtedly be the first point of attack, even though it can readily be proved in the long run that the machine has created more jobs and has been chiefly responsible for the worker being able to enjoy the fruits of his labor.

New Extras Adopted On Tin Plate

The Carnegie-Illinois Steel Corp. has published new extras and deductions on tin plate, effective Jan. 1, 1937. The new list supersedes that of March 17, 1936, and embodies a number of changes, particularly on the lighter weights. The principal changes are shown in the accompanying table (those indicated by the bracket being new), in addition to which the following new extras appear: Cokes—best, add 20c. per base box; Cokes—Kanners special, add 25c. per base box.

BASIS	Tare (Wood Boxes)	DEDUCT for Cokes	ADD FOR CHARCOALS					
			Special or A	2A	3A	4A	5A	Premier
55 lb.	5 lb.	$0.80	$0.70	$1.30	$1.95	$2.45	$2.95	$3.45
60 lb.	5 lb.	0.75	0.70	1.30	1.95	2.45	2.95	3.45
65 lb.	5 lb.	0.70	0.70	1.30	1.95	2.45	2.95	3.45
70 lb.	5 lb.	0.60	0.70	1.30	1.95	2.45	2.95	3.45
75 lb.	5 lb.	0.50	0.70	1.30	1.95	2.45	2.95	3.45
80 lb.	5 lb.	0.40	0.70	1.30	1.95	2.45	2.95	3.45
85 lb.	5 lb.	0.30	0.70	1.30	1.95	2.45	2.95	3.45
90 lb.	5 lb.	0.20	0.70	1.30	1.95	2.45	2.95	3.45
95 lb.	6 lb.	0.10	0.70	1.30	1.95	2.45	2.95	3.45
100 lb.	6 lb.	BASE	0.70	1.40	2.05	2.65	3.40	3.85
		ADD						
107 lb.	6 lb.	0.15	0.70	1.40	2.05	2.65	3.40	3.85
112 lb.	6 lb.	0.25	0.70	1.40	2.05	2.65	3.40	3.85
118 lb.	7 lb.	0.40	0.70	1.40	2.05	2.65	3.40	3.85
128 lb.	7 lb.	1.00	1.25	1.75	2.50	3.00	3.50	4.20
135 lb.	7 lb.	1.15	1.25	1.75	2.50	3.00	3.50	4.20
148 lb.	8 lb.	1.85	1.50	2.00	2.75	3.25	3.85	4.60
155 lb.	8 lb.	2.00	1.50	2.00	2.75	3.25	3.85	4.60
168 lb.	9 lb.	2.70	1.75	2.25	3.00	3.50	4.10	5.00
175 lb.	9 lb.	2.85	1.75	2.25	3.00	3.50	4.10	5.00
188 lb.	9 lb.	3.55	2.00	2.50	3.25	3.75	4.50	5.25
195 lb.	9 lb.	3.70	2.00	2.50	3.25	3.75	4.50	5.25

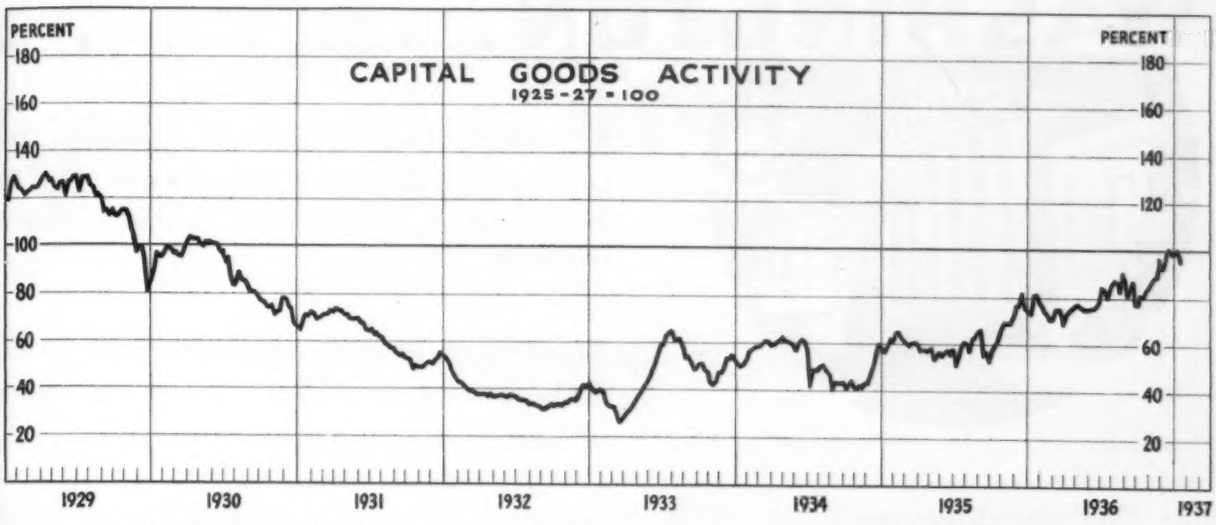
Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

Raw Materials:	December, 1936	November, 1936	December, 1935	Year, 1935	Year, 1936
Lake ore consumption (gross tons)[a]	.....	4,269,049	3,100,530	30,857,862	*40,087,939
Coke production (net tons)[b]	.....	4,288,392	3,488,818	35,209,240	*41,708,432
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	3,115,037	2,947,365	2,106,453	21,007,802	30,618,797
Pig iron output—daily (gross tons)[c]	100,485	98,246	67,950	67,556	83,658
Castings:					
Malleable castings—production (net tons)[d]	.....	50,934	45,598	466,395	*510,022
Malleable castings—orders (net tons)[d]	.....	58,152	42,573	452,611	*509,299
Steel castings—production (net tons)[d]	.....	.....	37,793	398,988	.....
Steel castings—orders (net tons)[d]	.....	.....	40,529	400,157	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	4,431,645	4,337,412	3,073,405	33,417,985	46,919,362
Steel ingot production—daily (gross tons)[e]	170,448	173,496	122,936	107,453	150,383
Steel ingot production—per cent of capacity[e]	77.66	79.05	55.53	48.54	68.52
Finished Steel:					
Trackwork shipments (net tons)[e]	5,579	4,756	3,025	42,229	68,813
Steel rail orders (gross tons)[e]	125,290	123,875	88,100	533,120	1,053,230
Sheet steel sales (net tons)[f]	.....	294,080	203,318	2,473,489	*2,383,572
Sheet steel production (net tons)[f]	.....	224,031	208,774	2,424,990	*2,367,559
Fabricated shape orders (net tons)[g]	.....	117,798	96,235	1,068,603	*1,429,348
Fabricated shape shipments (net tons)[g]	.....	128,306	76,214	1,095,216	*1,413,352
Fabricated plate orders (net tons)[d]	.....	40,519	35,584	258,315	*431,148
Reinforcing bar awards (net tons)[c]	18,550	18,740	29,025	318,340	334,790
U. S. Steel Corp. shipments (tons)[h]	.....	882,643	661,515	7,371,299	*9,757,767
Ohio River steel shipments (net tons)[i]	.....	127,425	61,666	926,174	*1,057,871
Fabricated Products:					
Automobile production, U. S. and Canada[k]	.....	394,890	418,317	4,119,811	*4,086,913
Construction contracts, 37 Eastern States[l]	.....	$208,204,200	$264,136,500	$1,844,544,900	*$2,475,600,300
Steel barrel shipments (number)[d]	.....	733,215	541,375	6,872,452	*7,653,994
Steel furniture shipments (dollars)[d]	.....	$1,645,626	$1,558,095	$15,523,679	*$17,132,963
Steel boiler orders (sq. ft.)[d]	.....	937,437	684,735	6,245,158	*9,807,475
Locomotive orders (number)[m]	.....	174	2	83	*354
Freight car orders (number)[m]	.....	1,550	10,030	18,699	*40,208
Machine tool index[n]	.....	147.1	98.3	†99.9	†134.0
Foundry equipment index[o]	.....	200.4	118.1	†119.5	†178.6
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	61,970	93,678	469,954	*614,254
Imports of pig iron (gross tons)[p]	.....	10,615	16,289	130,937	*155,486
Imports of all rolled steel (gross tons)[p]	.....	20,656	21,812	216,567	*250,626
Total iron and steel exports (gross tons)[p]	.....	203,297	239,269	3,067,336	*2,923,502
Exports of all rolled steel (gross tons)[p]	.....	123,159	85,590	897,749	*1,046,035
Exports of finished steel (gross tons)[p]	.....	100,344	78,625	767,456	*927,800
Exports of scrap (gross tons)[p]	.....	59,113	142,135	2,047,290	*1,778,685
British Production:					
British pig iron production (gross tons)[r]	.....	643,100	559,300	6,426,000	*7,010,200
British steel ingot production (gross tons)[r]	.....	1,001,300	811,500	9,842,400	*10,679,800
Non-Ferrous Metals:					
Lead production (net tons)[s]	.....	43,625	42,020	421,764	*415,896
Lead shipments (net tons)[s]	.....	50,153	42,333	433,456	*461,169
Zinc production (net tons)[t]	47,050	45,742	40,550	431,499	524,271
Zinc shipments (net tons)[t]	59,821	57,107	42,058	465,746	563,273
Deliveries of tin (gross tons)[v]	6,930	5,345	5,360	59,110	74,005

*Eleven months' total. †Three months' average.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.



Weekly Index of Rate of Activity in Capital Goods, Adjusted for Seasonal Variation, 1925-27 Average = 100

THE IRON AGE Weekly Index Numbers of Capital Goods Activity

(1925-27 Average = 100)

Last week	95.0	Same week 1933	38.4
Preceding week	*100.2	Same week 1932	50.3
Same week last month	97.5	Same week 1931	69.2
Same week 1936	81.4	Same week 1930	96.6
Same week 1935	59.0	Same week 1929	126.7
Same week 1934	49.9		

* Revised.

CAPITAL goods activity dropped off rather sharply last week, according to THE IRON AGE's seasonally adjusted index of this business. After correction of its components for seasonal change, the index registered a decline of 5.2 points to 95.0 per cent of average against 100.2 per cent in the preceding week. While steel mill operating schedules were sustained and automotive output increased during the period, neither of these indices gained after seasonal adjustment. Carloadings of forest products declined considerably, and construction work also receded. The only series to advance, in fact, was the index of industrial activity at Pittsburgh.

Relative to last year, however, the general level of durable goods operations remained promising, the week's figure of 95.0 corresponding with 81.4 for the corresponding period of 1935. Owing to unusual strength indicated during the year-end change over period, the index was prohibited last week from advancing in proportion to usual seasonal increase.

For the month of December, as averaged from the weekly figures, the index advanced to its highest monthly level during the entire year, the average of 97.8 comparing with 90.0 in November, the previous peak.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

A.F.A. Offers Prize To Stimulate Safety

THE American Foundrymen's Association, 222 W. Adams St., Chicago, announces that the 1937 A.F.A. Obermayer Prize will be awarded to person submitting the best idea or device for safety or health protection, or idea which could be used to stimulate interest in safety of foundry or pattern shop workers. Two awards will be made, a first prize of $50.00 and a second prize of $25.00.

Contestants for the prizes will be limited to foremen, journeymen, apprentices or shop workers in a foundry, or to some department of a plant operated in connection with a foundry or pattern shop, and must be either members of the A.F.A. or employed by a firm holding membership.

Entries in the contest may be submitted as a model, picture, drawing, or illustrated written description, and shall be one which is not patented. These will be displayed at the Milwaukee Convention the week of May 3 to 7. The awarding of the prizes will be determined by popular vote as cast by those viewing the entries.

WASHINGTON. . . . . .

. . . *President Roosevelt warns industry of further regulation—Asks employers to shift relief burden by hiring more workers.*

o o o

. . . *No mention is made of labor crisis, which is beginning to disturb some members of Congress.*

o o o

. . . *Basing point issue involved in cease and desist order signed by wire and cable manufacturers in FTC case.*

o o o

By L. W. MOFFETT
Resident Washington Editor, The Iron Age

o o o

WASHINGTON, Jan. 12.—That the President clearly proposes industrial regulation at the present session of Congress was made clear in his message on the "state of the union." That he will attempt to shift to industry the responsibility for future deficits was made clear in his annual message on the budget. That there will be little, if any, reduction in the huge Government administration costs will be made clear in the message he is to present today on reorganization of government departments.

With overwhelming majorities in both branches of Congress back of him, it is definitely to be expected that the President will push through whatever legislative program he seeks. It will be specifically developed from time to time later in the session, a session which promises to be long and grinding. More or less sharp controversies may arise, as, indeed, they already are appearing, some with administration policy and some within New Deal groups. But it is altogether probable that they will be of a brief, passing nature, and that in the end Congress will do as it is asked to do by the White House, some arguments to the contrary notwithstanding. Just as the previous Congress under the New Deal was a rubber stamp, so the present Seventy-fifth Congress also will be in all likelihood and on a magnified scale because of its increased New Deal majorities. Hence the flood of legislation introduced at the present session—some 3000 bills and resolutions—to regulate everything and everybody, for vast appropriations, and whatnot, may be discounted unless it has or gets Presidential approval.

Neither the message on the state of the union nor the budget message contained an unkind word for industry. Wherein they differed agreeably from some of the President's prior messages. The message on the state of the union, however, was decidedly a pointed lecture to the Supreme Court, which by this time, must have become used to lectures since they emanate in increasing volume from various sources, outstanding among them being John L. Lewis, chairman of the Committee for Industrial Organization. On the other hand, champions of the Supreme Court rise in increasing numbers in its defense. Meanwhile the court remains traditionally silent as if indifferent to both criticism and praise and rolls along with its deliberations.

Asks Court to "Cooperate"

The President, of course, did not mention the Supreme Court by name as he read his message on the state of the union. In effect, as stated by Representative Nichols of Oklahoma, the President pointed out that he expected the Supreme Court to be more liberal in its interpretations of the acts of Congress. He held, said Mr. Nichols, that the Supreme Court had not "cooperated" properly to bring about recovery. And in his message on the budget the President wants industry to "cooperate," which seems to mean only a one-way movement, to reemploy those on the relief rolls so that the budget may be balanced. Unless industry does so, the President, in effect said, the budget could not be balanced for the fiscal year 1938 or in future years.

In both messages he was entirely silent about the growing labor crisis, which, it was generally thought to be an altogether timely subject that could have been discussed in his message on the state of the union. The message, however, was limited in its range of subjects. It was rather vague except as to its reference to the Judiciary and the implication of industrial regulation, apparently a proposed regulation that will not be so hard and fast and impossibly cumbersome as was the NRA.

This regulation is to be brought about without a constitutional amendment if the Supreme Court will "cooperate." For the President urged that necessary betterment of labor and agriculture can best come through "Federal laws supplementing State laws" and that the vital need is "not an alteration of our fundametal law"—that is, the Constitution—"but an enlightened view with reference to it." This for the benefit of a Supreme Court, which by unanimous decision knocked out the NRA. No lecture for Congress was necessary. It "cooperates" wholeheartedly. Many think it "cooperates servilely.

No Plan for NRA Revival

The President did not make clear his means for setting up again prin-

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ciples of the NRA. He admitted the NRA had been too unwieldy for administration by a single Government body. Hence the proposed business regulation will call for regulation of hours, wages and unfair trade practices, the Supreme Court approving, by more than one agency.

It is known that in this connection administration sources, while not as yet decided on a definite plan, are drafting legislation which would empower the Federal Trade Commission to enforce "fair trade practices" as defined by Congress; to bar "starvation wages" or unreasonably long hours and to approve voluntary agreements on wages, hours, open price filing, etc., with anti-trust exemption to those adhering to such agreements.

Minimum wage and maximum hour standards for each industry, would be fixed by a separate Government agency, with code authorities entirely left out of the picture. The National Labor Relations Board would determine collective bargaining units, a power it now has but which is being challenged in cases attacking the constitutionality of the Wagner-Connery Labor Disputes act.

Child labor, of course, would be barred. Meanwhile, the President has appealed to 19 state governors and governors-elect to urge approval of a pending constitutional amendment to prohibit child labor.

The proposed modified NRA, now only in a tentative form, combines features of suggestions made on several occasions by Donald R. Richberg, former NRA administrator, and recommendations of the Council for Industrial Progress, headed by Major George L. Berry. Mr. Richberg was in conference with the President on the day following the reading of the message on the state of the union and it is assumed they discussed the proposed legislation. It is evident that care is being taken to keep it as clear as possible of constitutional entanglements.

Some Favor Amendment

Prominent members of Congress, however, doubt that such regulation can be made constitutional except by amendment and, having thought the President would propose such an amendment, were taken by surprise when he did not do so. The upshot was a split among Democrats in Congress over the question. Senator Ashurst, of Arizona, chairman of the Senate Committee on Judiciary, though a strong supporter of the President, served notice that, despite the President's message, he would press his constitutional amendment to give Congress power to regulate commerce, agriculture, and labor. Both Majority Leader Robinson of the Senate and Speaker Bankhead of the House had previously said that only by a constitutional amendment could the President's objectives be achieved.

Senator Norris, of Nebraska, former Progressive, now known as an "independent," has announced that he will fight for a constitutional amendment to permit Federal regulation of industry and agriculture. Senator O'Mahoney, of Wyoming, ardently trying to push it into the administration program, said that his bill for Federal licensing of corporations will solve the whole problem. This measure would fix minimum wages and standard hours and provide for collective bargaining. And then of course there are many other bills, some to rigidly curb the power of the Supreme Court.

The adminstration undoubtedly is greatly concerned over the widespread labor trouble and threatened labor trouble that is being agitated, particularly by the CIO. To the country at large labor trouble is the greatest menace with which it is immediately faced. Yet the President did not mention the subject. Nor is the administration giving any other public demonstration of its interest, though obviously it is a source of much administration discussion as well as some mild maneuvers by Labor Department representatives to bring about "conciliation." Moves seem to be carefully designed not to offend organized labor leaders.

M. C. Taylor Visits President

There was no confirmation of the report that the labor situation was a subject of discussion between the President and Myron C. Taylor, chairman of the United States Steel Corp., at the White House last Friday, but it was generally assumed that the matter was discussed.

"Just say we talked things over generally," Mr. Taylor said to correspondents as he emerged from the conference. "We have more people employed (in the steel industry) today than ever before and on the highest basis of wages. The average working hours per week is 40 and they are code hours, mind you."

While the President and Mr. Taylor were in conference, Philip Murray, chairman of the Steel Workers' Organization Committee, a CIO "subsidiary," said in Washington that the removal of Elmer J. Maloy as chairman of the Pittsburgh District Council of the Carnegie-Illinois Employee Representatives would have no effect on the drive to unionize the steel industry. Maloy as head of this council was of course in an incongruous position since he is a prominent SWOC agitator. As a member of the council it was charged that he was "boring within."

Despite the growth of strikes and consequent spread of unemployment, notably in the motor and allied industries, as the result of CIO activities, the President in his budget message placed his hope for a balanced budget for the fiscal year on reemployment by private indus-

ARE YOU CUTTING CORNERS?

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try of more workers. He warned that if industry fails to cooperate in giving employment to those on relief a larger sum than his estimate of $1,537,000,000 for relief of the unemployed will be necessary. Nothing was said about the need of cooperation by labor. The budget called for the staggering sum of $6,839,000,000, exclusive of appropriations for recovery and relief. Not only was there no warning to labor for unjustified strikes, but strikers have been told that those in need of relief will be granted Government funds.

Congress Alarmed by Strikes

There are prominent members of Congress who resent the widespread strike activities and are opposed to granting Federal money for relief of those who have gone on unjustified strikes. Also some of the leaders had hoped that the President's emergency relief requirements would not be so large as they were, though on the other hand some groups, indifferent to the implication involved, are fighting for still greater appropriations.

Chairman James P. Buchanan of the House Committee on Appropriations stated a generally accepted view when he said he did not regard the President's budget as establishing an actual balance. Others referred to it as a "paper balance" inasmuch as it does not provide a statutory debt requirement of $401,515,000, and is conditioned on circumstances that cannot be foreseen.

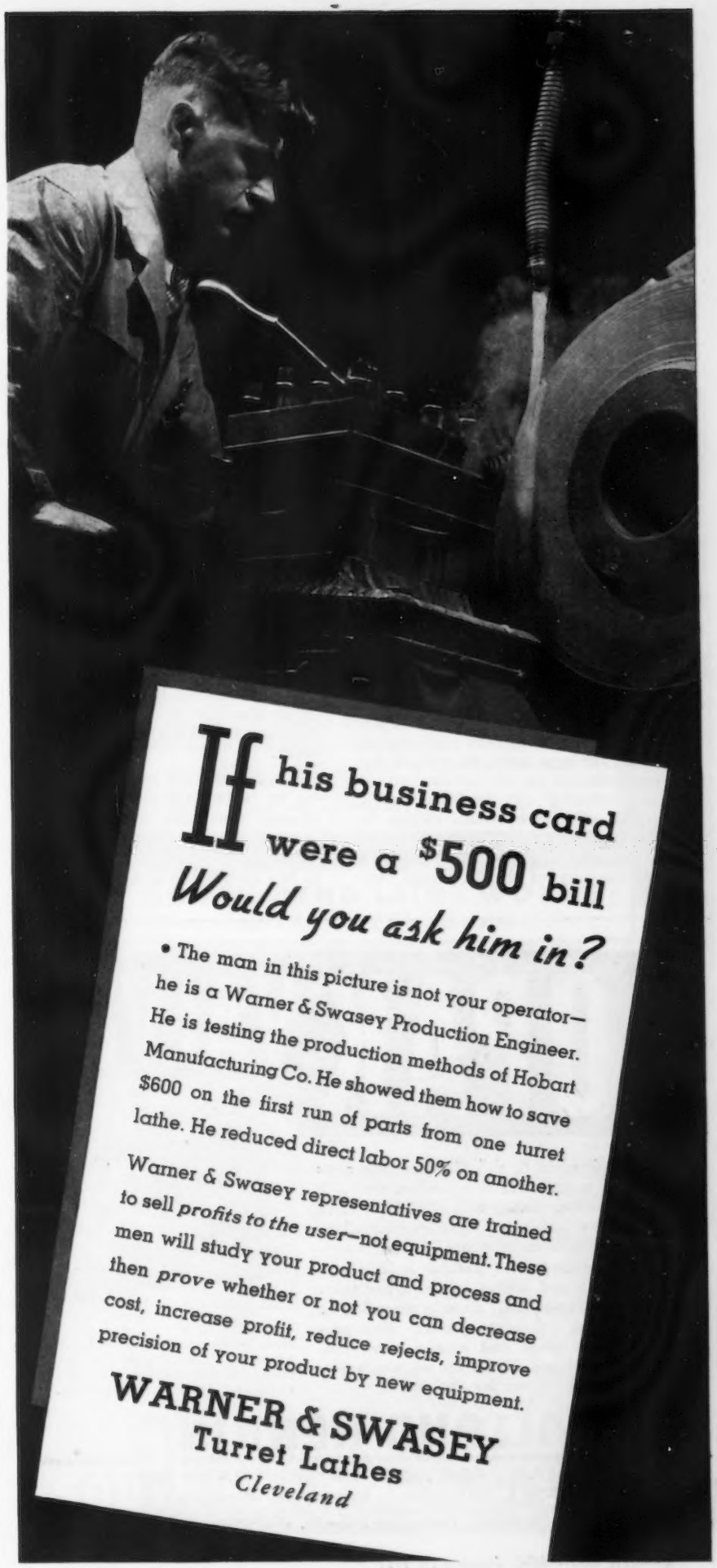
Mr. Buchanan said he would attempt to inaugurate a program of gradually reducing emergency relief appropriations by one-third each year until they entirely disappear. The accomplishment seems extremely doubtful, but it is his hope to hold relief requirements to $500,000,000 annually or $100,000,000 for each remaining month of the present fiscal year.

"If industry is recovering as rapidly as it appears to be and putting more men back to work all the time I don't see why we can't make a material cut in relief appropriations. The relief estimates make no reduction that amounts to anything," he said.

The belief prevails that like previous promises, the present promise of a balanced budget, beginning July 1, 1937, will not be fulfilled, particularly if labor trouble continues to spread.

Wants Industry to Give Jobs

The President suggested that if all employers or potential employers were to give jobs within the next six months to persons in receipt of Government funds the national budget could be kept in balance. This was coupled with the assumption that Federal receipts for the fiscal year 1938 would reach the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Turret Lathes
Cleveland

unprecedented total of $7,293,607,000. They would exceed by approximately $600,000,000 peak receipts in the 1920 fiscal year, derived from high corporate, individual and excess profits taxes. But taking away $774,800,000 in Social Security taxes, the estimated receipts for 1938 would be less than those of 1920. The total appropriations asked exceeded by $578,000,000 the actual and estimated appropriations for the present fiscal year.

The increase was attributed to an additional appropriation of $309,000,000 for the Social Security program; $80,000,000 for a general public works program and $189,000,000 in general departmental requirements, including $980,763,000 for national defense. In the total was $25,000,000 for laying down keels for two superdreadnaughts which are estimated to cost $50,000,000. The budget provides for liquidation of the PWA during the next fiscal year. The only PWA appropriation asked was $10,000,000 to be used for administrative purposes. PWA has a revolving fund of approximately $200,000,000 for loans and grants to municipalities. Request was made for an appropriation of $436,337,000 for a general public works program.

While the President made no request for new taxes, he did ask for continuation or the equivalent of the existing 19 nuisance taxes, which otherwise would expire in June and July. These taxes are estimated to raise $496,000,000. Continuance of the 3c. postal rate also was asked. Recommendation likewise was made that the Civilian Conservation Corps be made a permanent function of the Government and for that purpose the budget included $300,000,000 for 1938. It is reported that this organization will be made a part of the Interior Department under Secretary Ickes.

At a press conference the President said that eventually the Social Security act will have to be amended so as to eliminate the estimated accumulation of the reserve fund of $47,000,000,000 by 1980. These funds are to be theoretically earmarked for old age pensions and unemployment relief. The view was expressed that a sizable reserve fund should be established as a protection against contingencies and emergencies before the Social Security program is on a pay-as-you-go basis.

Basing Point Issue Involved in FTC Order Against Cable Makers

WASHINGTON, Jan. 12.—The Federal Trade Commission has issued a cease and desist order against the National Electrical Manufacturers' Association and 16 member manufacturers of power cable and wire which provides in its 10 inhibitions that the manufacturers shall not require customers to purchase only on the delivered price basis. The order also bars the producers from refusing to sell f.o.b. point of shipment.

The commission bases its authority to issue such an order on its charge that the practices complained of were the result of concerted agreement. It does not seek to bar quoting on a delivered price basis by independent action of individual producers.

Nevertheless, the order has aroused considerable interest because of the well-known opposition of the commission to the basing point system and the possible attempt to push at the present Congress session the Wheeler-Utterback bill which proposes to abolish the basing point system and to substitute the f.o.b. mill system. The measure has the strong support of the commission and it is understood that it will be reintroduced.

The order grew out of a complaint charging unfair methods of competition in violation of Section 5 of the Federal Trade Commission Act. The commission said that all material facts alleged in its amended complaint were admitted by the respondents to be true and that the findings are a paraphrase of the "admitted allegations." It said the manufacturers were found to have "concertedly adopted and maintained uniform selling prices under the leadership and in cooperation with the Okonite Co., General Electric Co., and Habirshaw Cable & Wire Corp." Other respondents were the American Electrical Works, Philadelphia, now known as the Kennecott Wire & Cable Co.; American Steel & Wire Co., Worcester, Mass.; Anaconda Wire & Cable Co., New York; Bishop Wire & Cable Corp., New York; Boston Insulated Wire & Cable Co., Boston; Crescent Insulated Wire & Cable Co., Trenton, N. J.; General Cable Corp., New York; National Electrical Products Corp., Pittsburgh; Phelps-Dodge Copper Products Corp., New York; John A. Roebling's Sons Co., Trenton, N. J.; Simplex Wire & Cable Co., Boston; Triangle Conduit and Cable Co., Brooklyn, and United States Rubber Products, Inc., New York.

While the order said the respon-

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dents admitted that the facts alleged in the amended complaint may be deemed unfair methods of competition within the meaning of Section 5 of the Federal Trade Commission Act, the respondents reserved the right to file substitute answers and to contest the case.

The commission said that as the result of agreement on use of the delivered price basis system, the manufacturers "habitually and systematically discriminated in price among the various customers after making due allowance for cost of transporation, exacting higher prices from customers having little or no transportation expense and accepting lower prices from those having heavy transportation expense."

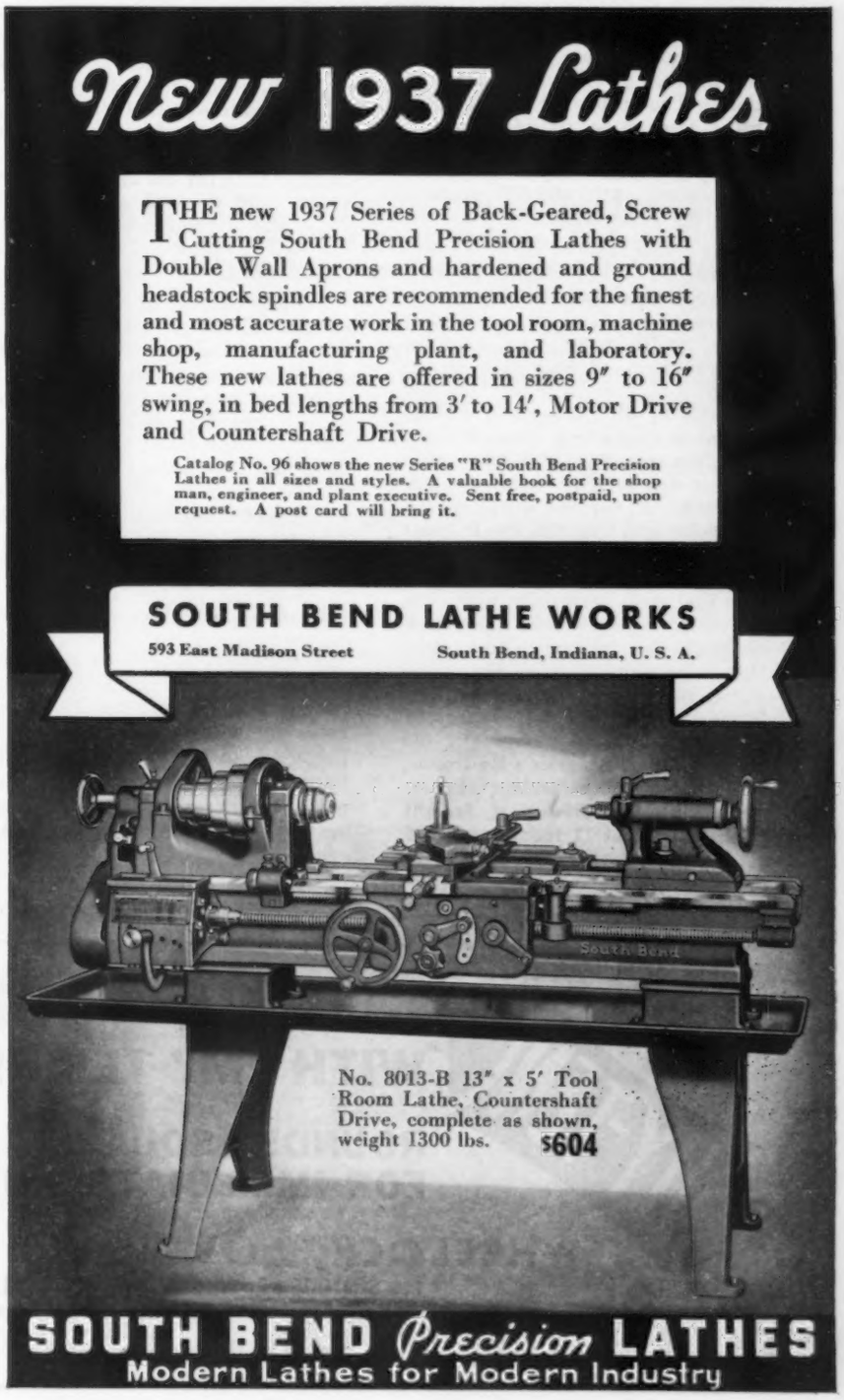
This contention, in brief, sets up the claim that the delivered price system puts nearby consumers at a disadvantage by increasing their capital accounts. In other words it argues for quoting f.o.b. point of shipment. The distant consumer would be required to pay the base price at such point plus freight charges, just as it is so required of the nearby consumer. This proposed radical departure in a system developed by industry is the nub of the whole controversy that has raged since the commission instituted proceedings in 1921 against the United States Steel Corp., resulting in an order in 1924 requiring certain subsidiaries to cease quoting Pittsburgh-plus. But the commission also insists on abolition of the multiple basing point system which has developed with the growth and spread of the industry.

The proposal is vigorously challenged by industries using the basing point system, employed independently of any concert of action or agreement. Under such a proposal, it has been pointed out, a mill could not possibly meet competition at the more distant points as is now done by quoting on the bases nearest the point of delivery and involving the absorption of freight charges. Thus, instead of stimulating, it would eliminate competition, localize the industry and increase prices, it is contended, and by restricting markets it would wipe out large units of the industry as well as compel the relocation of those able to move to the most important areas of consumption.

The commission order in the cable and wire case made allegations of agreements among producers that as to some products price lists specified a single delivered price to be paid throughout the United States and possessions while as to other products the price lists specified a single delivered price to be paid within each of a number of zones.

The charge that the delivered price system discriminates against various customers after making due allowance for the cost of transportation was believed in some quarters to be application of a provision of the Robinson-Patman Anti-Price Discrimination Act. However, it has been stated definitely that this is not true, and could not be inasmuch as the complaint involved solely Section 5 of the Federal Trade Commission Act. Legal authorities contend, however, that provisions of the Robinson-Patman Act lend themselves to attack on the delivered price system.

The commission did not overlook the opportunity to take another crack at the National Industrial Recovery Act. It blamed code provisions for supporting and reinforcing the agreements charged against the cable and wire makers.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Railroads Cite Rising Costs and Equipment Needs in Rate Rise Plea

WASHINGTON, Jan. 12.—Rising costs of materials and supplies constitute the chief contention of the railroads at hearings begun before the Interstate Commerce Commission last Wednesday for readjustment of the freight rate structure of the country. With surcharges eliminated Dec. 31, the carriers are seeking increased rates which they say are necessary to raise revenue for improvement of their properties and continuance of efficient transportation. The proposed increase in rates, if granted, would, according to estimates, amount to approximately $50,000,000 a year compared with about $100,000,000 realized from the surcharges.

The rising costs of materials was emphasized by Dr. Julius H. Parmelee, director of the Bureau of Railway Economics, Association of American Railroads, who estimated that because of increased prices the annual cost of materials and supplies of all kinds used by the railroads, including fuel, is now approximately $140,865,000 greater than it was in May, 1933. In listing costs of various supplies, Dr. Parmelee said that the rise in costs of iron and steel since May, 1933, has been 19 per cent. For certain iron and steel materials which the railroads buy in large quantities, he said, the increased cost since that date ranges from nearly 25 per cent up to 42 per cent. J. M. Symes, vice-president in charge of operations and maintenance of the Association of American Railroads, said that notwithstanding the installation of 39,556 new freight cars in the first 11 months of 1936 and a reduction of 49,633 cars in the number awaiting repair, both the ownership and the number of serviceable cars on Dec. 1, last, were the lowest since prior to the World War.

Expenditures for maintenance purposes in 1936, according to incomplete reports, were approximately $1,242,000,000, Mr. Symes said, or only approximately one-half as much as the annual average for the seven years from 1923 to 1929, inclusive. He said that Class I railroads in 1935 laid 575,874 gross tons of new rails compared with an annual average of 751,110 tons for the six-year period from 1930 to 1935 and 1,977,772 tons, the annual average for the seven-year period from 1923 to 1929, inclusive.

In accordance with suggestions of officials of the Association of American Railroads, Commissioner Aitchison, in charge of the hearings received evidence of a general nature and was followed by that covering individual commodities. Coal and coke were the first listed on the program, followed by iron ore, chrome ore and concentrates, manganese ore and concentrates, pig iron, steel and steel products, scrap and ferroalloys.

Railroad witnesses were sharply cross-examined by attorneys for coal interests when the coal and coke schedule was taken up, finding strong opposition to increased rates on these fuels, to which it is proposed to apply similar additional freight charges. It is proposed to increase the rates from 3c. to 11c. per ton, except on Lake cargo coal and in Western territory. In that territory the increase would be 1c. per ton where the rates are now $2 or more. On Lake cargo coal the proposed increase from Lake Superior and Lake Michigan docks is 5c. per ton so that the increased charges by rail-lake-rail would be the same as the increase when coal is moving all-rail.

Considerable opposition also exists against the proposed increased rates on iron ore. The Lake ore rate increase proposed is 5c. per net or 6c. per gross ton. Where rail transportation is beyond the Lake ports these rates also would be increased 5c. per net and 6c. per gross ton with inclusion of the same amount in the local rates. The protests are aimed particularly against the dual increases applying to rates for interior furnaces.

It is proposed to increase iron and steel commodity rates 10 per cent with a maximum increase of 1c. per 100 lb. or 20c. per net or gross ton, as rated. It is proposed to increase iron and steel column rates 1c. per 100 lb. On scrap it is proposed to increase commodity rates 20 per cent with a maximum increase of 20c. per ton and to cancel the 12½ per cent column rating and substitute a 15½ per cent rating at the 75,000 lb. maximum within, from and to Western territory. In other territories the proposed increase is 10 per cent with a maximum increase of 1c. per 100 lb. or 20c. per ton.

Application has been made to the Interstate Commerce Commission by B. F. Jones, railroad agent, for relief from the long-and-short-haul provision on shipments of pig iron from Ashland and Bellefonte, Ky., to Butler, Pa., in order to meet water competition.

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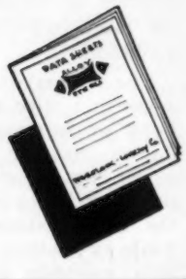

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Secretary Perkins Urges Shorter Hours and "Fair" Wages in Report

WASHINGTON, Jan. 12.—The annual report of Secretary of Labor Perkins, proposing a five-point program, advocates collective bargaining, shorter hours and an adequate annual income along with other recommendations.

"The solution of many of the vital problems should be worked out through the unofficial agencies of collective bargaining," Miss Perkins said. "It is the duty of the Department (of Labor), so far as possible, to foresee these situations in order that it may provide those interested with such relevant facts as only an agency of Government can collect with assured impartiality. It is the privilege of the department, so far as it is called upon, to assist through an expert interpretation of these data or through special studies."

The report, in its recommendations as to wage and hours standards, and collective bargaining apparently fits in with legislation which the administration now is studying.

Miss Perkins said that the department's program "seems to be in the direction of the following objectives:"

1. Intensifying its efforts for greater gains with respect to each of the following objectives:
   - Steady work in private employment.
   - Adequate assistance in securing jobs through the U. S. Employment Service.
   - Adequate facilities for training workers.
   - Shorter hours of work.
   - Adequate annual income.
   - Safe and healthful conditions of work.
   - Better industrial relations through collective bargaining, conciliation, mediation and arbitration.
   - Elimination of child labor.
   - Adequate care and support when incapacitated by reason of accident, industrial disease, unemployment, or old age.
   - Improving living and social conditions for wage earners.
2. Cooperating with each of the States in—
   - The development of a specific program for the advancement of labor standards designed to meet its respective needs.
   - Conferences within a State to promote this program.
3. Extending its scope to include all groups of wage earners.
4. Providing more and more adequate information with respect to employment, hours, wages and other conditions affecting the work and life of wage earners as a basis for sound public policy.
5. Promoting participation of wage earners in functions concerned with their employment, social, and living conditions.

Miss Perkins said that it is a matter of concern that employment has lagged behind production. Longer hours, expiration of an interval before the service industries reflect the increase in industrial production and employment, technological advance and gains in the efficiency of management were declared to be contributing factors to this discrepancy. There are those, she stated, who hold that this is but a temporary maladjustment which will disappear when recovery gets more momentum; others, that it is likely to continue.

"Whatever the developments in the future," the report said, "the fact that employment has not in every industry kept pace with production is one of the immediate aspects of the problem of unemployment with which we are confronted. Nor have we sufficient data to enable us, with precision, to formulate an immediately practicable plan to solve it. Shorter hours are proffered as an essential measure. But how much shorter is the all-important question. That a minimum should be set below which

(CONTINUED ON PAGE 79)

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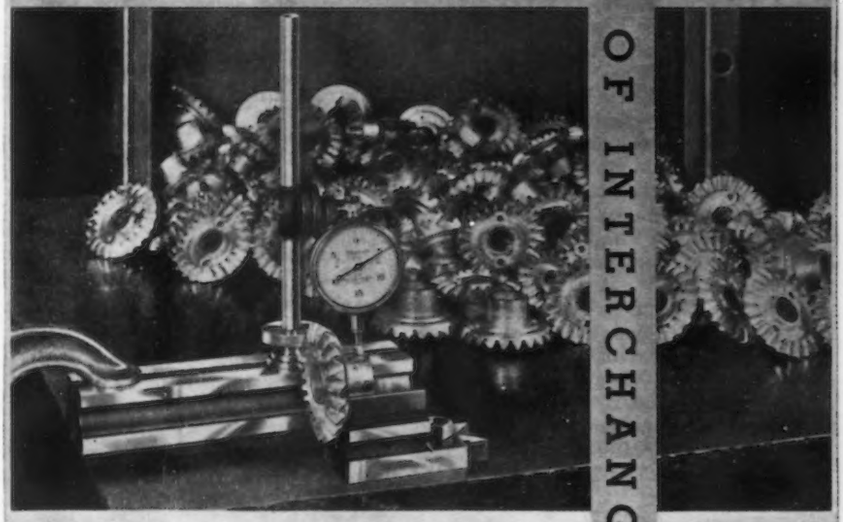

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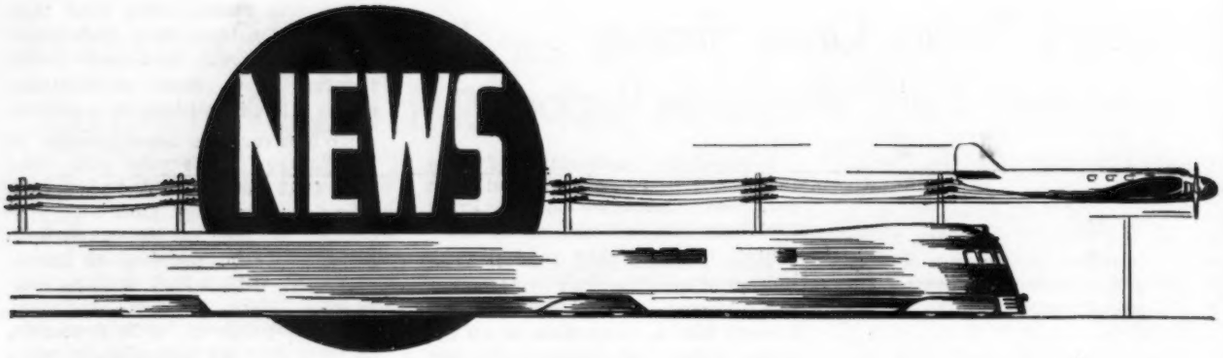

Carnegie Workers Oust Pro-Lewis Man, Form Committee to Settle Grievances

PITTSBURGH, Jan. 12—Making themselves heard above the terrific din of bitter attacks on the plan of employee representation by the Steel Workers' Organizing Committee, employee representatives of 18 Carnegie-Illinois Steel Corp.'s plants in the Youngstown-Pittsburgh district last week ousted Elmer J. Maloy, rabid pro-Lewis advocate, as chairman of the employee district committee. In his place went W. R. Hill, representative of one of the company's Ohio works and loyal backer of the employee representation plan. Although SWOC sympathizers who were also members of the general district committee tried their best to defeat the Maloy ouster, the vote turned out 25 to 11 in favor of the change.

At the same meeting the employee representatives whose constituents comprise at least 100,000 Carnegie-Illinois workers went on record by a majority as favoring a recent proposed resolution which called for the defense of the employee representation plan against outside agencies. Successful also was a vote by the body to take issue with the National Labor Relations Board in case the decision of the latter should go against the plan of employee representation.

Up for discussion at several meetings in the past and finally settled last week, was the question of what to do about alleged cases of company domination on the part of management. The central committee suggested the formation of a grievance committee whose duty it would be to settle all cases of alleged domination. Main purpose of the formation of this committee was to scotch any attempts by outside unions to bring up the question of company domination. Meeting with the committee last week, Benjamin F. Fairless, president of Carnegie-Illinois Steel, gave official sanction to the newly formed committee and promised management's full support in getting at the bottom of reports of domination by supervisors or superintendents. At the same time, Mr. Fairless expressed his confidence in the collective bargaining machinery so bitterly opposed by Mr. Lewis and his SWOC. To the committee he said: "We want to make the employee representation plan as near perfect as possible. We realize that it is not 100 per cent perfect but we believe it is the best method of collective bargaining found so far. It requires the proper cooperation of men and management."

The Carnegie - Illinois official promised that the company's policy toward the new grievance commit-

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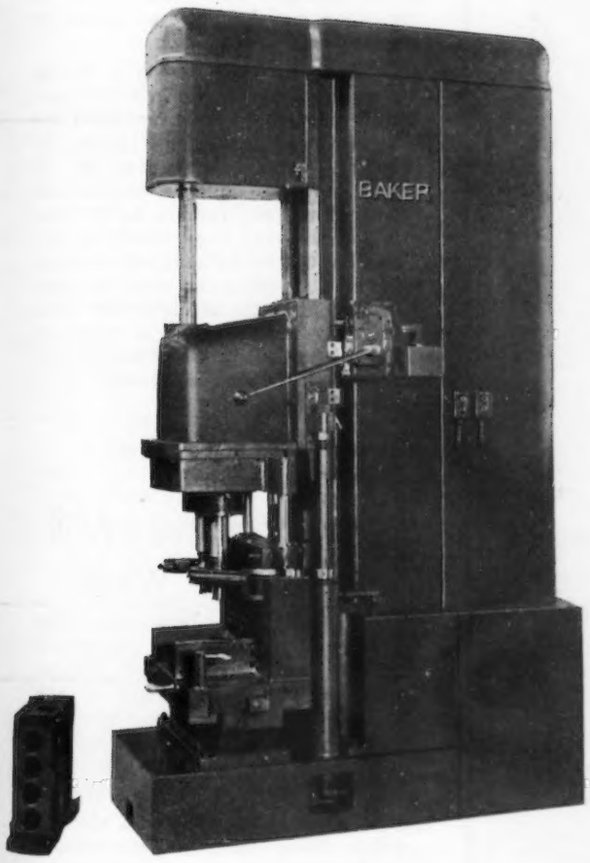

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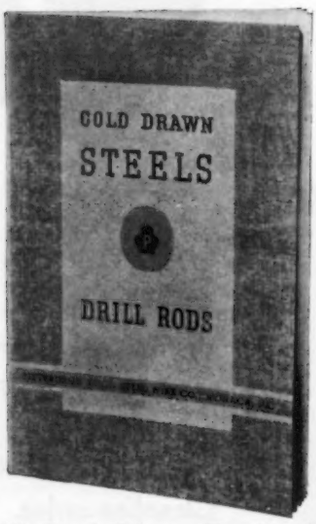
tee would be outlined in writing and it was indicated that the committee's duties would be unique in the history of employee representation. They are to have full powers of investigation and will be in a position to "crack down" on any supervisors or superintendents who refuse to cooperate in collective bargaining as set forth in the plan of employee representation. The committee will serve as an admirable vehicle in disproving loose accusations of company domination, which, so far, have been the motivating issue behind the attacks on the plan.

In an apparent attempt to disrupt the meeting at which Maloy was recalled, SWOC tactics in subpoenaing five members of the central committee failed to halt the forward action of the representatives.

The militant drive on the part of defenders of the employee representation plan featured by visits of a "flying squadron" to the various Carnegie-Illinois plants, has had its effect and last week, the majority of the representatives at the Duquesne works voted on the side of the employee representatives where heretofore they had been sympathetic with the aims of the SWOC. This particular plant is the "home ground" of Maloy, recently deposed general chairman.

Meanwhile, the SWOC has not been caught napping and last week their "flying squadron" paid a visit to the Aliquippa works of the Jones & Laughlin Steel Corp. while steel workers were receiving pay checks. Their recently adopted up-to-date method of garnering new members by use of loud speakers, self-addressed application blanks and high pressure salesmen took place. The SWOC had also to their credit an election last week at the Allegheny Steel Corp.'s plants, when one of their members defeated a pro-company man as special employee representative. This position is the job held by the contact man between the plant company union and management, and previous to the election was held by the president of the local plant union.

That a reaction has set in among some employee representatives who were previously "flirting" with the Lewis organization is shown by several recent comments to the effect that an employee representative should not remain as a member of the very body which he and the SWOC so bitterly condemned. No matter what the final outcome in the fight to unionize the steel industry might be, it is apparent that the pro-Lewis and anti-Lewis forces will be extremely active during the coming months.



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New Homestead Mill Opening This Week

PITTSBURGH, Jan. 11.—The formal opening and inspection of the newly completed 100-in. semi-continuous plate mill at the Homestead works of the Carnegie-Illinois Steel Corp. will take place on Friday, Jan. 15, with a number of invited guests in attendance.

This program includes a visit to other mills of the Homestead works, luncheon at the works cafeteria, an afternoon observation of the new mill in operation and a reception and dinner at night at the William Penn Hotel.

Myron C. Taylor, chairman, William A. Irvin, president, and other officials of United States Steel will attend, as well as a number of customers who will use the products of the mill and financial editors and other representatives of the daily and trade press.

Steel Mill Workers Opposed to SWOC Heard by Labor Board

WASHINGTON, Jan. 12.—The first formal employee move of steel employees to counter the unionization drive in the steel industry by John L. Lewis' Committee for Industrial Organization was made yesterday when attorneys for the Carnegie-Illinois Steel Corp. employee representation plans in the Gary district made a motion before the board to intervene as the board resumed hearings of the CIO's Steel Workers' Organization Committee complaint against the Carnegie-Illinois Steel Corp.

Claiming to represent about 50,000 employees, members of 12 councils of employee representation plans in the Gary district, the petition for intervention was presented by Attorneys Alex Pendleton and Benjamin Wham. Informing the board that they were acting entirely independently of the Carnegie-Illinois Steel Corp., the attorneys told the board that they desire to appear solely for the employees. Their objective, it was explained by Attorney Pendleton, is to improve conditions of the employees.

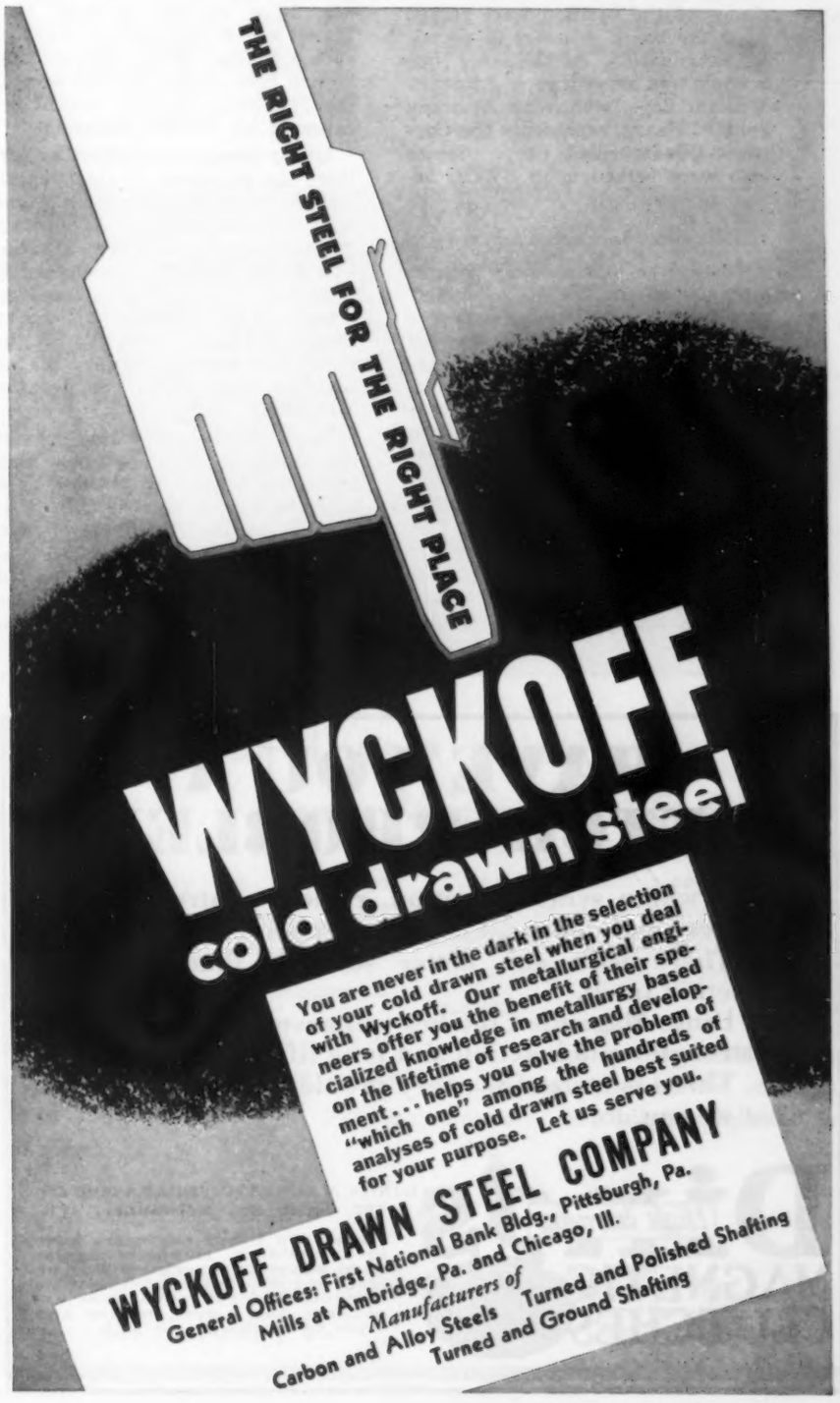
The petition pointed out that, inasmuch as this is also the objective of the board, the employees want to cooperate with it to this end. It stated that the employees believe that this can best be done within the framework of the employee representation plans under which it was declared many improvements have already been made. With the cooperation of the employees and the board, it was urged that further improvements can be made under the employee representation plans.

Coercion Charges Called False

Branding as wholly unfounded SWOC charges of company coercion and domination of employees, the employee representation groups said that unless they are allowed to intervene they could not protect their rights and interests. Specifically the employees are members of employee representation plans at the Gary tin mill, South works, Gary sheet mill, Gary works and the Elwood, Ind., American works of the Carnegie-Illinois Steel Corp.

Attorney Pendleton said that the question of whether the United States Steel Corp. and the Carnegie-Illinois company, respondents to the pending complaint, had violated the Wagner-Connery Labor Act was not the primary issue with the employee representation groups. He said that if later developments show changes in the plans are necessary it is still the desire to preserve the framework of the plans. Pointing out that the plans had been in operation only two years, Mr. Pendleton said that he did not contend they do not make possible abuses and grievances but they, it was added, can be easily remedied. The principal thing desired, it was insisted, is to continue the framework of the plans which were said to provide the best medium for collective bargaining and to improve conditions of workers. If the plans are abolished, Mr. Pendleton said, the workers would suffer.

In reply to a question by Chairman J. Warren Madden of the board, Mr. Pendleton said he was not sure that there would be any compensation for appearing as counsel for the employee represen-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You are never in the dark in the selection of your cold drawn steel when you deal with Wyckoff. Our metallurgical engineers offer you the benefit of their specialized knowledge in metallurgy based on the lifetime of research and development . . . helps you solve the problem of "which one" among the hundreds of analyses of cold drawn steel best suited for your purpose. Let us serve you.
WYCKOFF DRAWN STEEL COMPANY
General Offices: First National Bank Bldg., Pittsburgh, Pa.
Mills at Ambridge, Pa. and Chicago, Ill.
Manufacturers of
Carbon and Alloy Steels Turned and Polished Shafting
Turned and Ground Shafting

tation groups. He said it is hoped to receive compensation from them, but that no compensation was to be received from the steel company nor was either he or Mr. Wham appearing for it in any way whatsoever. If necessary, he said, he would agree to go without any compensation in order to see that the employee representation groups may present their case before the board.

Attorney G. L. Patterson of the board intimated that the motion was intended to delay the proceedings but was assured that was not the purpose. At his suggestion copies of the petition were served upon the board in order to permit its examination. At the same time a copy was served upon Attorney William Beye, who, with Attorney John J. Heard, represents the Carnegie-Illinois Steel Corp. Copies also were served upon SWOC organizations.

Hearings to Last All Week

The present and second series of hearings on the SWOC complaint promises to last at least over the remainder of the week. On conclusion of SWOC testimony and cross-examination counsel for the steel company will call witnesses from employee representation groups, this being independent of testimony which Attorneys Pendleton and Wham have asked to present through employees in the Gary district.

The hearing was resumed with further direct testimony by Elmer J. Maloy, ousted chairman of the Pittsburgh district council, and chairman of the Duquesne, Pa., Works Committee of the SWOC. The Pittsburgh district council is made up of both members of employee representation groups and of the SWOC. Maloy was ousted by a vote of 25 to 11, but remains a member of the Pittsburgh district council.

The Maloy testimony, directed by Attorney Patterson, evidently was intended to show that Maloy's ousting was inspired by the company management, but when he intimated as much Chairman Madden upheld the objection of Attorney Beye on the grounds that Maloy had no evidence to support such a charge. Maloy claimed that he had been ousted as chairman of the Pittsburgh district council because of his SWOC affiliation.

Under cross-examination by Mr. Beye the processes of steel manufacture were explained at some length by Mr. Maloy. Apparently it was the purpose of the examination to show that manufacture is intrastate and not interstate commerce and that therefore the Labor Board is without authority in the case. The constitutionality of the act has been challenged by the company.

Mr. Beye also asked Maloy about the employee representation plan and amendments that have been made to it from time to time as it applies to the Duquesne works, where Maloy is engaged as a stripper crane operator. Maloy admitted that although chairman of the rules committee he did not know all the details of the plan and charged that no employee could know them since the amendments as printed were not kept up to date. He conceded that they were posted as they were adopted in the mills and were available to all employees.

Maloy also conceded that an election on the plan for Duquesne works in February, 1934, was conducted by secret ballots exclusively by employees and met with overwhelming approval. He maintained, however, that he tried to get two "extraneous" issues on the last election ballot but that the company wouldn't permit it.

"You know that it is provided by an annual election whether the plan is to be continued, don't you?" asked Mr. Beye.

Maloy said he never heard of it and tried to make the point that the company under the rules had the exclusive right to hire or fire employees or do "most anything else under the sun." He said that he tried unsuccessfully to have this provision struck out, but his attention was directed to the fact that the employees themselves had the right to continue or to discontinue the plan. Mr. Beye also said it was ridiculous to think the company would discharge an employee unless there was good reason for so doing.

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—One where synchronization, remote control, operating safety and dependability are demanded?

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Dings Magnetic Clutches will answer your demands for strength, quick action and long life.

There is a size for every problem. Let us tell you what we can do.

Dings High Intensity MAGNETIC CLUTCHES

DINGS MAGNETIC SEPARATOR CO.
727 Smith St., Milwaukee, Wis.

Since 1899 Dings engineers have been building magnetic equipment. Here is experience that no other manufacturers of this type of equipment can offer. Such experience has a real dollars and cents value to you.

Tennessee Company To Expand Wire Mill

THE Tennessee Coal, Iron & Railroad Co., Birmingham, has announced that upward of $200,000 will be expended for additions and improvements at its Fairfield wire mill to increase capacity 23,000 tons annually. Improvements will include the installation of modern wire drawing and finishing equipment and remodeling of some existing equipment.

Navy Awards Orders For Stainless Steel

WASHINGTON, Jan. 12.—In a lot drawing, the Navy Department has awarded 184,743 lb. of stainless steel bars, plates and sheets for stock at various navy yards and stations. The awards were distributed as follows: Crucible Steel Co. of America, 81,438 lb.; Eastern Rolling Mill Co., 59,680 lb.; Midvale Co., 33,625 lb.; Carnegie-Illinois Steel Corp., 10,000 lb. The department also has awarded 1045 tons of sheets to the Apollo Steel Co.

U. S. Steel Plant Tells Workers It Will Always Stand for "Open Shop"

THE following notice has been posted in the mills of the Tennessee Coal, Iron & Railroad Co. in Alabama, informing workers that the company will continue to stand for the "open shop," will never require employees to belong to any union to gain employment, and will defend their right to work without outside interference and coercion:

Birmingham, Ala.,
Jan. 6, 1937.

It has come to our attention that some of our employees are being approached by representatives of the CIO and are being coerced by them to line up under the threat that if they do not join now, that later on when they get a majority of the employees signed up they will demand a closed shop and recognition of the union, as the sole collective bargaining agency of all our workers, and that those who have not joined by that time will not be permitted to work.

In order that no employees may be misled by such threats, we are again informing you of the company's policy and position, which is as follows:

First—The Tennessee Coal, Iron & Railroad Co. will continue to adhere to the open shop policy and will continue to recognize for the purpose of collective bargaining the representatives of its own workers, whether union or non-union, but will not recognize any union as the sole bargaining agency for its workers, to the exclusion of all others.

Second—The Tennessee Coal, Iron & Railroad Co. will continue to depend on the ability and efficiency of its workers for successful operations and not on the membership or non-membership in any labor organization whatsoever. This means that you do not have to pay tribute to anyone for the right to work.

Third—The Tennessee Coal, Iron & Railroad Co. will continue to pay the highest justifiable wages in the future, as it has in the past, and just as it is doing at the present. We ask, therefore, that you not be misled or influenced by such threats as those to which you are now being subjected by representatives of the CIO, but rest assured that:

The Tennessee Coal, Iron & Railroad Co. has always stood for the open shop and will continue to do so.

It will never require employees to belong to any union in order to gain employment.

On the contrary, it will defend their right to work, free from outside interference and coercion.

Finally, it is possible that certain of our employees who signed these application cards purely for the purpose of getting rid of the organizer do not realize that in so doing they are investing the CIO with power-of-attorney to represent them regardless of whether or not they want to be represented by that organization and it would be well, therefore, to weigh carefully the consequences of such action before signing these application cards.

Tennessee Coal, Iron & Railroad Co.
By J. L. Perry, President.

The Traffic Club of Pittsburgh will hold its thirty-sixth annual dinner in Pittsburgh on Jan. 22. Dr. Neil Carothers of Lehigh University will be the principal speaker. It is expected that the attendance will exceed 1600. The Traffic Club annual dinners are largely attended by industrial and railroad executives from points east of Chicago. A. R. Kennedy, traffic manager, Pittsburgh Steel Co., is chairman of the Traffic Club of Pittsburgh. The speakers committee is headed by H. E. Graham, assistant to president and general traffic manager, Jones & Laughlin Steel Corp. Toastmaster at the dinner will be J. A. Coakley, general traffic manager, U. S. Steel.

40,000 Shelves a month—

says Westinghouse Electric,

are cleaned by the Bullard-Dunn Process using Duriron anodes. The ten anodes inside the tank are the same as the two in the foreground.

Duriron Circulating Steam Jets are also used in the same plant for the heating and circulating of pickling solutions.

If you use acids in any part of your processing, it will pay you, as it has others, to use Duriron Company equipment for its great acid resistance.

A copy of a new catalog, now being printed, will be sent you upon request. Just ask for Bulletin No. 1000.

THE DURIRON COMPANY, Inc.

438 N. Findlay St. Dayton, Ohio

..PERSONALS..

S. S. MARSHALL

H. T. WOOLSON

W. W. SMITH

S. S. MARSHALL, JR., has been appointed general manager of manufacturing operations of the Jones & Laughlin Steel Corp. Since Feb. 6, 1936, Mr. Marshall has been assistant general manager of manufacturing operations and prior to that time was general superintendent of the Pittsburgh works. He started with the company in 1903 in the engineering department, and his entire business experience has been with the company. The appointment of Mr. Marshall will enable F. E. FIEGER, vice-president, to devote more time to executive duties.

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HARRY THURBER WOOLSON, executive engineer, Chrysler Corp., assumed the presidency of the Society of Automotive Engineers on Jan. 14. He has been associated with Chrysler Corp. since its beginning. Back in the early 1920's, he was associated with the Zeder-Skelton-Breer Engineering Co., the triumvirate out of which the Chrysler engineering department grew and still derives its strength. This group was originally associated with Walter P. Chrysler at the Willys Corp., Elizabeth, N. J., where Mr. Woolson was chassis engineer. He became chief engineer of the Chrysler Corp. upon its formation in 1925 and was promoted to executive engineer a year ago. He is also vice-president of the marine division of the Chrysler Corp.

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W. WAITS SMITH, formerly service engineer, has been appointed executive engineer of the Studebaker Corp., South Bend, Ind. In his new duties, Mr. Smith will direct the experimental machine shop, service engineering, engineering material orders, new programs, engineering budgets and will coordinate all the various activities of the engineering department. Mr. Smith received his technical training at the University of Michigan and broad practical experience in the experimental department of the Mutual Electric Machine Co., Detroit. He has been associated with Studebaker since 1925, when he became mechanical assistant to the service manager of the Studebaker branch in Detroit. When Rockne Motors was formed, Mr. Smith was made general service manager and in 1933 was transferred to South Bend as service engineer.

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HOWARD H. TALBOT has been made senior engineer with duties of general engineering consultant by the United Engineering & Foundry Co., Pittsburgh. MAURICE P. SIEGER, heretofore assistant chief engineer, has been appointed chief engineer. J. W. O'BRIEN, who has been assisting Mr. Sieger, has been made assistant chief engineer, and G. G. BEARD, while continuing in charge of proposal engineering, is to be supported by Mr. Talbot so that he may devote himself largely to sales engineering. DR. MORRIS STONE is to be in charge of a new engineering development division.

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E. S. BISSELL, since 1929 technical adviser on industrial applications in the instrument division of the Bausch & Lomb Optical Co., has joined the staff of the Mixing Equipment Co., Rochester, N. Y., and will have charge of advertising and sales promotion.

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F. G. HURLBURD has been appointed assistant to Campbell

THE STARTING POINT *of*

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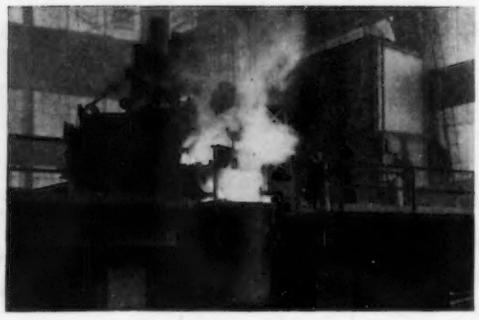
FORGINGS

CARBON-ALLOY AND SPECIAL BASIC ELECTRIC STEELS



COMPLETE control of all processing from selection of the melting charge to the finished condition is the N. F. & O. *guarantee of quality* in forgings furnished to your specifications—Smooth Forged, Hollow Bored, Rough or Finished Machined.

NATIONAL FORGE AND ORDNANCE CO.

IRVINE, WARREN COUNTY, PENNA., U. S. A.

Wood, director of utility sales for the Kelvinator Corp., Detroit.

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THOMAS H. WILBER has been appointed general manager of the Bullard-Dunn Process division of the Bullard Co., Bridgeport. This division engineers and licenses the use of the process for the descaling of metals. THOMAS E. DUNN, JR., has also been appointed to the sales department and will have his offices at 309 Miller-Storm Building, Detroit.

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GEORGE R. MURRAY, formerly specialist sales engineer of the Chambersburg Engineering Co., Chambersburg, Pa., has been appointed works manager of the Chambersburg plant in charge of all production operations. He has been identified in various capacities with the company since 1900, when he joined the erecting shop as a mechanic. He later was made superintendent of erection and service and subsequently superintendent of production. In recent years he has served as a sales engineer.

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FRANKLIN R. HOADLEY, heretofore vice-president of the Farrel-Birmingham Co., Ansonia, Conn., has resigned to become president of the Atwood Machine Co., Stonington, Conn. He has been connected with the company and its predecessor, Farrel Foundry & Machine Co., since his graduation from Yale University in 1914. Following his return after service in the Army during the war, he became foundry manager in 1919 and was elected a director in 1923. After the merger of the Farrel company with the Birmingham Iron Foundry in 1927, he became a director of the newly formed Farrel-Birmingham Co. and was elected vice-president in 1930. Mr. Hoadley has been active in trade association work and was recently elected president of the National Founders' Association, after having served a term as vice-president.

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R. B. MOORE has been appointed distributor, with offices at Bolivar, N. Y., and Bradford, Pa., by the New York Belting & Packing Co., Passaic, N. J.

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H. R. WELLER has been appointed district sales manager at Cleveland by the General Refractories Co., Philadelphia, succeeding JOHN C. HOPKINS, who has resigned to become associated with the Wellman Engineering Co.

T. H. WILBER

T. E. DUNN, JR.

G. R. MURRAY

ELLIS T. KNOBLOCH, who has been identified with the Union Iron Works, Erie, Pa., since his graduation from college, has been appointed general manager, succeeding E. H. BREVILLIER, who has resigned as general manager but will remain as vice-president.

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EUGENE L. RIPPEL has been transferred from the Dover, Ohio, office of the Greer Steel Co., to the Chicago office, where he will serve as district representative. He succeeds CLEVELAND MORSE, who has become affiliated with the Standard Steel & Wire Corp., Chicago.

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W. F. PIPER, vice-president and secretary of the Beardsley & Piper Co., Chicago, has left on a round-the-world business and pleasure trip. He plans to investigate foundry conditions, practices and equipment the world over.

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ROBERT G. GUTHRIE, past-president of the American Society for Metals and consulting metallurgist for the Peoples Gas Light & Coke Co., Chicago, has been ap-

PRECISION SCREENS

In the preparation of food products and in the screening, sizing and straining operations of chemicals, minerals, stone, coal and other materials, perforated metal plays an important part. H&K standards of quality and accuracy assure you of all that is best in screens. May we aid you in your selection?

Grilles of unusual beauty in exclusive designs suitable for public and commercial buildings and private homes. Ornamental sheets for radiator enclosures and metal furniture are furnished of any metal. Write us for prices and samples.

ANY METAL ANY PERFORATION

The Harrington & King PERFORATING Co.

5657 FILLMORE ST., CHICAGO 114 LIBERTY ST., NEW YORK

pointed chairman of the ferrous metals committee of the industrial gas section of the American Gas Association.

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A. D. CHISHOLM, who has been assistant general manager of the iron mines of Pickands, Mather & Co., has been appointed general manager, succeeding WILLIAM P. CHINN, who retired Jan. 1. His headquarters are in Duluth. Mr. Chinn has been identified with the iron mining industry in the Lake Superior district for many years. He became assistant general manager of the ore properties of the company in 1918 and general manager in 1922. Mr. Chisholm became associated with the company in 1924 as range manager on the Gogebic Range and became assistant general manager in 1931.

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C. H. WOOD has resigned as vice-president of the Ohio Seamless Tube Co., Shelby, Ohio, with which company he has been connected for 36 years.

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J. LESLIE MILLER, who has been assistant chief engineer of the Carnegie-Illinois Steel Corp. in the Youngstown district, has been appointed assistant combustion engineer of the Republic Steel Corp. with headquarters in Cleveland. He had previously been employed in the experimental engineering department and as a fuel engineer by the Carnegie Steel Co. and a fuel engineer for the Wheeling Steel Corp.

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GEORGE F. KENDRICK has been appointed manager of the marine department of Pickands, Mather & Co., Cleveland, succeeding C. C. CANFIELD, who has retired after holding that position 24 years. Mr. Kendrick has been assistant manager of the department for several years.

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L. W. HARSTON has been elected vice-president in charge of sales of Steel & Tubes, Inc., Cleveland, subsidiary of Republic Steel Corp. He has been manager of sales of the company's mechanical tube division and has been associated with the company 20 years. Previously he was a salesman for the Atlas Car & Mfg. Co., Cleveland.

J. A. IRELAND, who has been district sales manager for the central district and affiliated with the company since 1922, has succeeded Mr. Harston as manager of sales for the mechanical tube division and J. J. I. JAMIESON has succeeded Mr. Ireland as central district sales manager. Mr. Jamieson, who has been a salesman in the central district, joined Steel & Tubes in 1929 and previously for four years was an assistant in the metallurgical laboratory of the American Steel & Wire Co.

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FLOYD A. BEATTY, vice-president in charge of engineering of the Lewis Foundry & Machine Co., a subsidiary of the Blaw-Knox Co., has been appointed operating vice-president, and FRED F. FANNING, assistant engineer has been promoted to chief engineer.

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N. D. DEVLIN, who for the past two years has been general superintendent of the Rotary Electric Steel Co., Detroit, has been appointed vice-president in charge of operations. Prior to going with Rotary Electric in 1935, Mr. Devlin was associated with the Timken Steel & Tube Co., Canton, Ohio, and prior to that with the Central Alloy Steel Co., Massillon and Canton, Ohio. He received his early training in the steel industry with the Carnegie Steel Co.

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GEORGE L. ANDERSON has become affiliated with the Philadelphia office of the Patterson Foundry & Machine Co., as sales engineer. He is a chemical engineer and for 20 years has specialized in the design, application and sales of process equipment in chemical, food and other industrial plants in the process industries.

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WILLIAM CORDES SNYDER, JR., vice-president and manager of roll sales of the Lewis Foundry & Machine Co., a subsidiary of Blaw-Knox Co., has been elected a director of Blaw-Knox Co.

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RUDOLPH FURRER has resigned as industrial engineer of the manufacturing department of the main works of the Allis-Chalmers Mfg. Co., Milwaukee, to rejoin the A. O. Smith Corp., Milwaukee, with which he was associated from 1918 to 1932. For the last five years of this period Mr. Furrer was chief engineer and director of research. He joined the Allis-Chalmers company in 1907 in the old Scranton, Pa., works and was transferred to West Allis, Milwaukee, in 1911. Following his resignation from the Smith organization in 1932, Mr. Furrer became assistant to the vice-presidents of the National Tube Co., Pittsburgh. He rejoined the Allis-Chalmers company several months ago.

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SAMUEL M. CASSIDY has been appointed manager of the Weirton Coal Co., subsidiary of the Weirton Steel Co. He will be located at the company's mine at Isabella, Pa. He succeeds O. G. LEICHLITER who has resigned to devote his time to oil interests in the Southwest. The new Weirton executive was born near Lexing-

★

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Our concentration on tubing enables us to give customers the benefit of our special skill and experience. Large stocks available for immediate shipment—Tool Steel Tubing, Ball Bearing Tubing, Stainless Tubing, Aircraft Tubing, Hypodermic Tubing, Cold Drawn Mechanical Tubing, A.S.M.E. Boiler Tubing.

May We Serve You?

THE BISSETT STEEL COMPANY, Cleveland, O.

The Tubing Specialists

TELL BERNA, new general manager of the National Machine Tool Builders' Association, whose appointment was announced in last week's issue.

ton, Ky., in 1902 and attended grade and high schools in his native State. He was graduated from the University of Kentucky in 1925 with the degree of E.M., and in that same year became associated with the Allen & Garcia Co., consulting engineers, of Chicago. With this firm he worked at various types of mining throughout the United States, but specialized mainly in coal mining. In 1932 Mr. Cassidy was employed by the South Chicago Coal & Dock Co. as general manager of two mines in eastern Kentucky. He left this position the following year to go with the Saxton Coal Mining Co. at Terre Haute, Ind., where he remained for three years. During the past year he has been associated with Robert S. Walker, consulting engineer for the M. A. Hanna Co., Cleveland.

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DR. JOSEPH C. DONCHESS, formerly of Youngstown, has been appointed assistant to DR. F. W. MERRITT, chief medical officer at the Gary, Ind., plants of the Carnegie-Illinois Steel Corp. Dr. Donchess worked for several years as a laborer for the Youngstown Sheet & Tube Co. to earn the money needed to pay college expenses. After finishing at the University of Pittsburgh, he studied at the Massachusetts General Hospital and at the Lahey Clinic in Boston. During the past year Dr. Donchess has had further post-graduate training in traumatic surgery in the Pittsburgh district.

WALTER M. SAUNDERS, JR., of Providence, has been made president of the New England Foundrymen's Association, to succeed A. R. WRIGHT.

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HARRY C. CLOW, production manager of the Eagle Lock Co., has been made secretary of the company to succeed the late Charles W. Plumb.

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WALTER J. KOSLOW, for many years with the American Can Co., was recently appointed manager of the tin plate department.

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DWIGHT SPOFFORD, advertising manager of the Duriron Co., Dayton, has been elected president of the newly-formed Dayton Industrial Marketers Association.

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RUSSELL T. KERNOLL, who has had many years of experience in pressure vessel and welded equipment fabrication, has been made chief engineer of welded fabrication for the Edge Moor Iron Works, Edge Moor, Del. He was formerly identified with the M. W. Kellogg Co., Jersey City, N. J., and the Struthers-Wells Co., Warren, Pa.

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PIERCE T. WETTER, who for the past 10 years has been on the staff of the American Society of Mechanical Engineers, has been made executive vice-president of the American Cutting Alloys, Inc., New York. He will have charge of the manufacture and sale of cemented carbide titanium tips and cutting tools.

MARTIN H. SCHMID, whose appointment as manager of alloy sales, Republic Steel Corp., was recently announced.

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W. L. MARTWICK, who has been identified with the Foster Wheeler Corp., New York, since 1926, has been appointed general sales manager. He was formerly president of the Aero Pulverizer Co. before it was acquired by the Foster Wheeler Corp.

SIMPLEST ADJUSTMENT

of the piston packing from the outside of Hannifin air cylinders means that high efficiency piston seal is maintained throughout the entire life of the packing. Friction is reduced, maximum power secured without waste of air. Write for Bulletin 34-A.

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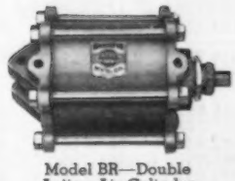
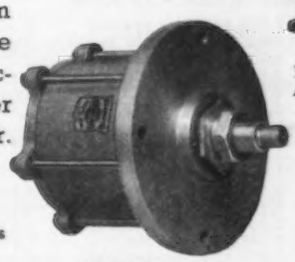
621-631 So. Kolmar Ave., Chicago, Illinois
ENGINEERS • DESIGNERS
MANUFACTURERS
Pneumatic and Hydraulic Production Tool Equipment



Model BR—Double Acting Air Cylinder

Model CR—Double Acting Air Cylinder



Model JR—Double Acting Air Cylinder

EIGHT mounting types, sizes 1 to 16 inch bore, for any length stroke. Other sizes to order. Single and double acting types.

HANNIFIN "Leak-Proof" AIR CYLINDERS

Steel Ingot Production in 1936 Increased 40 Per Cent Over 1935

PRODUCTION of bessemer and open-hearth steel ingots in 1936 totaled 46,919,362 gross tons, the highest figure recorded in seven consecutive years and exceeded only in 1928 and 1929. The total 1936 output, moreover, rose 40 per cent over the 33,417,985 gross tons produced in 1935. As calculated from official returns by the American Iron and Steel Institute, the year's production coincided approximately with THE IRON AGE'S estimate made several weeks ago that the 1936 output would roughly amount to 47,000,000 tons.

In turning out this tonnage, the industry operated during 1936 at 68.52 per cent of capacity, compared with a rate of 48.54 per cent for 1935. This proved to be just 1.31 points away from THE IRON AGE'S estimate for the year, as averaged from the weekly ingot rates, of 67.21 per cent of capacity. While last year the ratio of output to capacity was the best since 1929, all told it was exceeded in 11 earlier years over the past 20 because of steady increases in the industry's producing capacity as the country's population expanded.

The output for the last quarter of 1936, which totaled 13,314,058 gross tons, was the highest fourth quarter total in history and the largest for any three-month period since the third quarter of 1929. It compares with 12,278,969 tons in the preceding quarter of 1936 and 9,366,573 tons in the final quarter of 1935. Operations during the period averaged 77.77 per cent of capacity, against 71.73 per cent for the previous quarter and 54.24 per cent in the corresponding 1935 quarter.

In December, 1936, ingot production aggregated 4,431,645 gross tons, against 4,337,412 tons in November and 3,073,405 tons in December, 1935. Operations for the month averaged 77.66 per cent of capacity. This tonnage was exceeded by one other month during the year, but it proved to be the highest December output in the history of the industry. The previous record, established in December, 1928, was 4,018,208 tons.

It is interesting to note that during 1936 production of open-hearth steel ingots averaged 70.92 per cent of open-hearth capacity, against 50.17 per cent in 1935. Output of bessemer steel, on the other hand, was at 48.06 per cent of bessemer capacity, as against 35.91 per cent for 1935. The percentage of bessemer steel ingots produced in 1936 to total production declined to 7.37 from 8.48 in 1935.

REPORTED BY COMPANIES WHICH IN 1935 MADE 98.03 PER CENT OF THE OPEN-HEARTH AND 100 PER CENT OF THE BESSEMER INGOT PRODUCTION

	Reported Production (Gross Tons)		Calculated Monthly Production All Companies		Number of Working Days	Per Cent of Operation
1934	Open-Hearth	Bessemer	Monthly	Daily		
January	1,786,458	172,489	1,997,129	73,968	27	33.59
February	1,993,465	175,873	2,211,944	92,164	24	41.86
March	2,540,243	203,904	2,798,440	103,646	27	47.07
April	2,622,531	257,482	2,936,064	117,443	25	53.34
May	3,003,676	331,620	3,399,494	125,907	27	57.18
June	2,718,782	282,592	3,059,483	117,672	26	53.44
July	1,340,924	119,869	1,489,453	59,578	25	27.06
August	1,245,139	109,598	1,381,350	51,161	27	23.24
September	1,127,269	117,615	1,268,977	50,759	25	23.05
October	1,325,777	127,789	1,481,902	54,885	27	24.93
November	1,447,626	132,059	1,610,625	61,947	26	28.13
December	1,794,437	131,467	1,964,257	78,570	25	35.68
Total	22,946,327	2,162,357	25,599,118	83,312	311	37.38
1935						
January	2,578,531	239,858	2,870,161	106,302	27	48.02
February	2,499,744	224,336	2,774,271	115,595	24	52.22
March	2,582,628	230,810	2,865,292	110,204	26	49.78
April	2,361,275	231,916	2,640,602	101,562	26	45.88
May	2,332,042	254,796	2,633,661	97,543	27	44.06
June	2,007,862	210,487	2,258,664	90,347	25	40.81
July	2,003,151	224,456	2,267,827	87,224	26	39.40
August	2,629,768	233,361	2,915,930	107,997	27	48.78
September	2,540,264	233,737	2,825,004	113,000	25	51.04
October	2,815,510	270,719	3,142,759	116,398	27	52.58
November	2,841,199	252,163	3,150,409	121,170	26	54.73
December	2,789,015	228,392	3,073,405	122,936	25	55.53
Total	29,980,989	2,835,031	33,417,985	107,453	311	48.54
1936						
January	2,793,421	196,389	3,045,946	112,813	27	51.40
February	2,707,562	202,445	2,964,418	118,577	25	54.03
March	3,095,375	185,040	3,342,619	128,562	26	58.58
April	3,565,821	304,775	3,942,254	151,625	26	69.09
May	3,670,401	302,092	4,046,253	155,625	26	70.91
June	3,578,044	334,897	3,984,345	153,263	26	69.83
July	3,525,281	326,606	3,922,731	150,874	26	68.74
August	3,768,832	350,560	4,195,130	161,351	26	73.52
September	3,782,056	303,048	4,161,108	160,043	26	72.92
October	4,144,013	317,710	4,545,001	168,333	27	76.70
November	3,928,904	329,553	4,337,412	173,496	25	79.05
December	4,045,746	304,596	4,431,645	170,448	26	77.66
Total	42,605,456	3,457,711	46,919,362	150,383	312	68.52

Navy Buys Copper In Open Market

WASHINGTON, Jan. 12.—Application by the Navy Department of the emergency section of the Walsh-Healey Government Contracts Act to purchase 400,000 lb. of copper is expected to inaugurate a policy that it and other departments of the Government will pursue in obtaining supplies of steel and other requirements when there is immediate need for them. Purchase of sizable lots of steel tonnages has been held up because of exceptions to provisions of the Walsh-Healey act made by steel manufacturers in bids on tonnages for naval vessels. If the demands for the steel are sufficiently pressing to warrant it, it is expected the Navy Department will, as in the case of copper, resort to the emergency section which exempts sellers from the wage and hour provisions of the act.

Both the War and Navy Departments appealed to Secretary of Labor Perkins for exemptions from the act in order that they might secure requirements, but in a letter to the Secretary of War it was ruled in substance that there could be no exemptions except under the emergency section or as to certain articles.

This section authorizes purchases in the open market without advertising for proposals in cases of emergency. Hence in applying the provision the Navy bought the copper without advertising for bids. Previously it had advertised, without results, for six months' supply of copper, amounting to 2,600,000 lb. The award of the 400,000 lb. lot under the emergency section was divided equally between the Kennecott Sales Corp., New York, and the Calumet & Hecla Co., Boston, for immediate shipment.

...OBITUARY...

HARRY BLOODSWORTH, vice-president and treasurer of Crucible Steel Casting Co., Lansdowne, Pa., died at his home in that city on Dec. 22, aged 67 years. He started in the steel industry in 1889 with the Stickney Iron Co., Baltimore. He later was identified in various capacities with the Tidewater Steel Co., American Steel Casting Co., and Chester Steel Casting Co., all of Chester, Pa., until 1905, when he became one of the founders of the Crucible Steel Casting Co.

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WILLIAM A. E. DRESCHER, vice-president of the Bausch & Lomb Optical Co., Rochester, N. Y., died after a brief illness at his home in Rochester, N. Y., on Dec. 30. Mr. Drescher's association with the company had extended over a period of 60 years and he had been active in the administration of the business until two weeks before his death.

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HENRY VOGT, president of the Henry Vogt Machine Co., Louisville, Ky., and one of the city's outstanding industrialists, died of heart disease on Dec. 27, aged 80 years.

Secretary Perkins Urges Shorter Hours

(CONTINUED FROM PAGE 67)

wages cannot fall is another generally accepted necessity.

"Voluntary agreements on shorter hours and minimum fair wages among employers within an industry and possibly between one industry and another would be a step in the right direction. Whether such agreements are likely without compulsion of legislation is questionable. Continued leadership on the part of the Government in the restoration of employment and increase in the purchasing power of wage earners is being more and more accepted as essential in the public interest.

"In any consideration of the constituency of the Department of Labor, question arises as to its relationship to organized wage earners. Organized labor took the lead in promoting legislation for the creation of this department and for comparable departments in the States, but they never have argued for the operation of these departments exclusively in their own behalf. Rather have they recognized the necessity and desirability of a public policy which permits no distinctions in service to organized and unorganized wage earners."

An adequate annual income should never be thought of in inflexible terms, according to Secretary Perkins. "Adequacy must always be viewed against the existing background of technical possibilities," she says. "Under primitive conditions the mere avoidance of starvation may have been adequate. Today in the United States, considering on the one hand our resources and on the other hand the existence even in 1929 of millions of families with incomes of less than $1,000, there is general acceptance of adequacy as the amount necessary to support an individual or family in health, efficiency, and comfort. Even before this ideal has been attained through the development of new techniques and the better organization of resources it will be time to establish higher standards of adequacy."

Tied Down by Custom?

No matter what bonding or rust-prevention process your company has been using these past years, you will want to look into this new Marks Bond process.

Your present equipment may be used. Saves time on processing. This bonding process has proven effective under many commercial tests and will give a satisfactory coating in 30 seconds. • It permits a saving on equipment space. • Saves on fuel and heating of tanks, requiring a solution of only 140 to 160 degrees. • Sludge practically eliminated. • Has passed salt spray and humidity tests. • Gives controlled etching—light or heavy. • Has been officially approved by several of Detroit's largest industrial plants.

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MONTHLY SHIPMENTS OF STEEL PRODUCTS BY UNITED STATES STEEL CORP.

Month	1933 Shipments	1933 Per Cent of Capacity	1934 Shipments	1934 Per Cent of Capacity	1935 Shipments	1935 Per Cent of Capacity	1936 Shipments	1936 Per Cent of Capacity
January	285,137	17.7	331,777	19.8	534,055	31.9	721,414	44.8
February	275,929	18.5	385,500	25.9	583,137	39.2	676,315	45.3
March	256,793	15.3	588,209	35.2	668,056	41.5	783,552	50.5
April	335,321	21.6	643,009	41.5	591,728	36.7	979,907	63.2
May	455,302	27.1	745,063	44.5	598,915	35.8	984,097	63.4
June	603,937	37.4	985,337	61.2	578,108	36.7	886,065	57.1
July	701,322	45.1	369,938	23.9	547,794	34.0	950,851	61.3
August	668,155	39.8	378,023	22.6	624,497	37.3	923,703	59.6
September	575,161	35.6	370,306	23.9	614,933	39.7	961,803	62.0
October	572,897	35.5	343,962	20.6	686,741	41.1	1,007,417	62.6
November	430,358	26.7	366,119	22.7	681,820	42.3	882,643	59.2
December	600,639	38.7	418,630	27.0	661,515	42.7	1,067,365	68.8
Plus or minus yearly adjustment	(44,283)	...	(19,907)	...	(23,750)	...	.....	...
Total for year	5,805,235	30.1	5,905,966	30.6	7,347,549	38.1	10,825,132	58.2

Steel Corporation Ships More Steel In 1936 Than in Any of Past Six Years

SHIPMENTS of finished steel products by subsidiary companies of the United States Steel Corp. totaled 10,825,132 tons in 1936, an increase of 3,477,583 tons or 47.3 per cent over the 1935 volume of 7,347,549 tons. The total was the largest in six consecutive years, or since 1930, when the corporation commenced to report its monthly shipments.

Based on total shipments, the corporation's finished steel-making facilities were engaged during the year at an average rate of 58.2 per cent of capacity, against a figure of 38.1 per cent for 1935.

Shipments in December aggregated 1,067,365 tons, an increase of 184,722 tons over November and of 405,850 tons over December, 1935. This tonnage exceeded all prior months since May, 1930, in which 1,207,385 tons was shipped.

During the December period operations required to produce the volume of steel shipped averaged 68.8 per cent of capacity. The November rate was 59.2 per cent, while in December, 1935, it was 42.7 per cent.

Lincoln Electric Co. Establishes Arc Welding Research Foundation

TO further stimulate scientific development in the arc welding field and to honor the pioneer work of its president in promoting arc welding and in developing equipment and electrodes, the Lincoln Electric Co., Cleveland, has established a fund and foundation, the objects of which, as set forth in the board of directors' inauguration and resolution, are as follows:

"Whereas, it is desired in the public interest that careful and extensive scientific study, research and education in respect of development of the arc welding industry be encouraged; and

"Whereas, the comparatively recent developments of electric arc welding discloses a vast field of study and research which is yet in its infancy . . ., and

"Whereas, through such study and research, the public and modern industry should have the benefit of accurate knowledge and information in matters affecting the application of electric arc welding to machinery and equipment; and

"Whereas, it is the desire of the company to assist in furthering said objects and to provide suitable rewards therefore:

"Be it resolved that the Lincoln Electric Co. should, and does hereby, found, create and establish for such purpose, a scientific educational fund and foundation, which shall be organized and operated exclusively for the purposes set forth in this resolution; and further, as a token of its esteem and respect for James F. Lincoln and for his wide experience and interests in said scientific subjects, it denominates such as The James F. Lincoln Arc Welding Foundation."

Principal direction of the foundation's work will be by Dr. E. E. Dreese, chairman, department of electrical engineering, Ohio State University. Other trustees are W. B. Stewart, member of the Cleveland Bar, and H. R. Harris, vice-president, Central United Bank of Cleveland. Organization of a comprehensive program by these directors is now nearing completion.

In commenting upon the honor bestowed upon him, James F. Lincoln stated, in part:

"In laboratory and in mill and factory the world around, scientists and technicians are seeking to develop new phases of the electric arc as a superior welding technique. . . . With the aid of the electric arc,

JAMES F. LINCOLN

many industrial methods, together with new processes of incalculable benefit, have been made commonly available. Yet, so recent is the development of arc welding as a practical process, its full benefits have been experienced by not more than one in five potential users.

"The sole purpose of this new foundation is to challenge the attention of manufacturers whose products benefit society; and to stimulate the ingenuity of every engineer and skilled worker interested in extending the frontiers of knowledge and achievement. This arousing of interest through the foundation will result, I believe, in lower production costs for thousands of devices and commodities now employed in manufacture or moving in commerce, and will give constantly increasing markets the benefit of better, stronger and more serviceable goods."

December Pig Iron Output 3,115,037 Tons

ON the basis of revised returns from companies producing pig iron, actual production of coke pig iron in December was 3,115,037 gross tons, compared with 2,947,365 tons in November. The daily rate last month showed a gain of 2.3 per cent over that of November, or from 98,246 tons to 100,485 tons.

Total output for 1936 was 30,618,797 tons, compared with 21,007,802 tons in 1935, a gain of 45.7 per cent, and was the highest since 1930, when production totaled 31,399,105 tons.

On Jan. 1, there were 170 furnaces making iron, operating at a rate of 101,480 tons daily, compared with 164 furnaces on Dec. 1, producing at the rate of 99,205 tons daily. Furnace changes as given in last week's issue, p. 178, remained the same.

Daily Average Production of Coke Pig Iron

Gross Tons

	1936	1935	1934	1933	1932
January	65,351	47,656	39,201	18,348	31,380
February	62,886	57,448	45,131	19,798	33,251
March	65,816	57,098	52,243	17,484	31,201
April	80,125	55,449	57,561	20,787	28,430
May	85,432	55,713	65,900	28,621	25,276
June	86,208	51,750	64,338	42,166	20,935
½ year	74,331	54,138	54,134	24,536	28,412
July	83,686	49,041	39,510	57,821	18,461
August	87,475	56,816	34,012	59,142	17,115
September	91,010	59,216	29,935	50,742	19,753
October	96,512	63,820	30,679	43,754	20,800
November	98,246	68,864	31,898	36,174	21,042
December	100,485	67,950	33,149	38,131	17,615
Year	83,658	67,556	43,592	26,199	23,733

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1936	1935	1936	1935
January	2,025,885	1,477,336	24,766	10,048
February	1,823,706	1,608,552	24,988	12,288
March	2,040,311	1,770,028	22,725	17,762
April	2,403,683	1,663,475	19,667	18,302
May	2,648,401	1,727,095	18,363	17,541
June	2,586,240	1,552,514	17,549	12,961
½ year	13,528,226	9,799,000	128,058	88,902
July	2,594,268	1,520,263	20,205	13,175
August	2,711,721	1,761,286	20,658	12,735
September	2,730,293	1,776,476	15,919	15,983
October	2,991,887	1,978,411	19,805	19,007
November	2,947,365	2,065,913	24,368	18,245
December	3,115,037	2,106,453	25,715	17,126
Year	30,618,797	21,007,802	254,728	185,173

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Merchant Iron Made, Daily Rate

Tons

	1936	1935	1934	1933	1932
January	10,537	3,926	7,800	2,602	6,256
February	11,296	6,288	7,071	2,863	7,251
March	10,831	7,089	7,197	2,412	1,157
April	13,897	8,799	8,838	1,908	5,287
May	12,814	8,441	9,099	3,129	4,658
June	14,209	7,874	9,499	4,088	6,090
July	11,619	8,644	7,880	6,783	3,329
August	12,148	8,194	6,043	7,756	3,070
September	12,526	10,090	4,986	10,034	3,213
October	13,645	11,199	5,765	8,634	4,286
November	14,739	12,503	6,610	7,639	4,435
December	14,852	13,312	4,399	8,358	3,674

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) December (31 Days)	Production (Gross Tons) November (30 Days)	January 1 Number in Blast	January 1 Operating Rate, Tons a Day	December 1 Number in Blast	December 1 Operating Rate, Tons a Day
New York:						
Buffalo	224,063	211,730	12	7,230	12	7,060
Other New York and Mass.	5,614	28,391	1	180	1	175
Pennsylvania:						
Lehigh Valley	70,073	57,659	6	2,575	5	1,920
Schuylkill Valley	26,347	26,483	3	1,280	2	885
Susquehanna and Lebanon Valleys	25,242	17,824	1	815	1	595
Ferromanganese	.....	.....	0	....	0	....
Pittsburgh District	721,406	674,862	35	22,545	35	22,805
Ferro. and Spiegel	13,405	13,190	3	430	3	440
Shenango Valley	62,973	59,633	4	2,030	4	1,990
Western Pennsylvania	95,322	89,631	6	3,100	5	2,990
Ferro. and Spiegel	12,310	11,178	3	395	2	400
Maryland	129,009	118,034	5	4,160	5	3,935
Wheeling District	130,365	121,801	7	4,650	6	4,060
Ohio:						
Mahoning Valley	302,095	293,288	14	9,745	14	9,775
Central and Northern	258,673	272,195	14	8,775	14	9,070
Southern	53,146	49,136	4	1,715	4	1,640
Illinois and Indiana	627,082	568,840	28	20,455	26	19,445
Michigan and Minnesota	98,009	88,353	6	3,160	6	3,075
Colorado, Missouri and Utah	40,091	27,003	3	1,365	2	900
The South:						
Virginia	.....	.....	0	....	0	....
Kentucky	18,879	25,478	1	395	2	850
Alabama	200,933	192,656	15	6,480	15	7,195
Tennessee	.....	.....	0	....	0	....
Total	3,115,037	2,947,365	170	101,480	164	99,205

Freyn to Build Armco Furnace

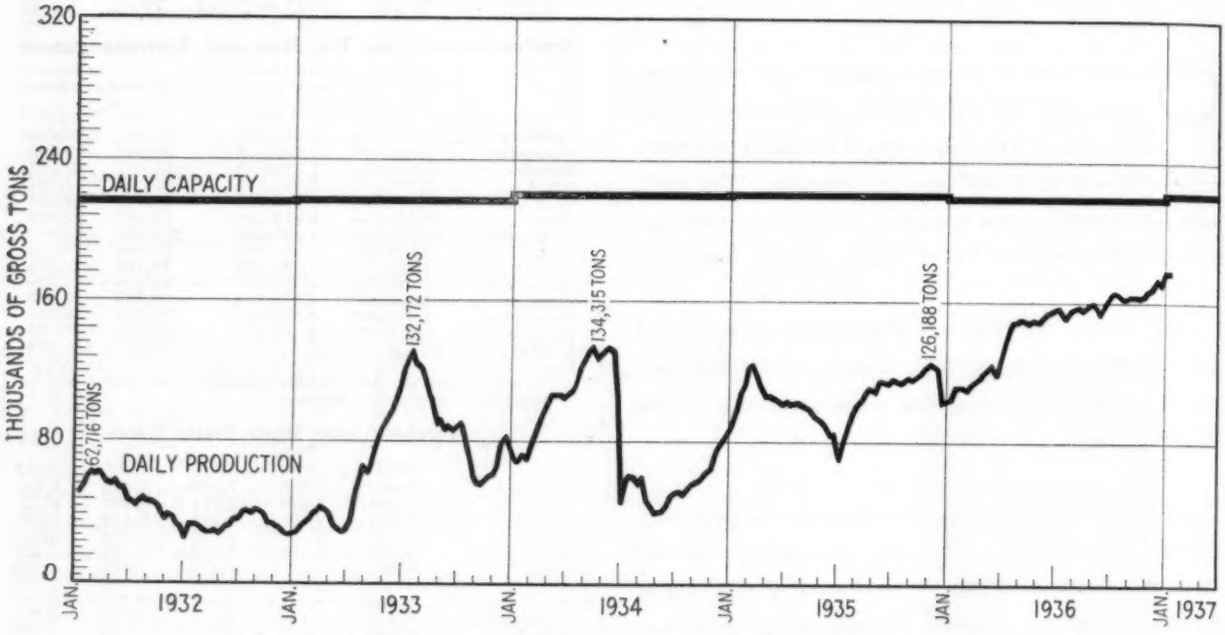
THE Freyn Engineering Co., Chicago, has been awarded the contract for the construction of the new blast furnace for the Hamilton Coke & Iron Co., Hamilton, Ohio, subsidiary of the American Rolling Mill Co. An item regarding this new furnace appeared in THE IRON AGE of Dec. 24, p. 68. The furnace will have a daily capacity of 500 tons of pig iron. New gas cleaning equipment, water cooling basin, extension to the ore yard, stock house and bin system and other items are included in the Freyn contract.

A directory of the membership of Gray Iron Founders' Society will be issued soon as a guide to the purchaser of gray iron castings and as an adjunct of the national advertising campaign for gray iron now being carried on by the society. Copies are available at the society's office, 1010 Public Square Building, Cleveland.

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1933-1937

Current Week	Last Week	Weeks Ended Jan. 11, 1936	Jan. 12, 1935	Jan. 13, 1934	Jan. 14, 1933
177,057	177,057	111,931	108,477	72,662	35,751



Figures for the current week are not indicated on the chart until the following week.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended Dec. 12, 1936	Jan. 11, 1936	Jan. 12, 1935
Pittsburgh	80.0	79.0	75.0	39.0	27.0
Chicago	77.0	77.0	77.5	50.0	50.0
Valleys	75.0	73.0	78.0	62.0	56.0
Philadelphia	56.5	56.5	54.5	39.0	28.0
Cleveland	76.0	79.0	76.0	61.0	69.0
Buffalo	78.5	82.0	84.0	45.0	41.0
Wheeling	94.0	95.0	94.0	72.0	90.0
Southern	74.5	69.5	69.5	45.0	29.0
Ohio River	97.0	95.5	91.0	79.0	60.0
Western	91.5	91.5	59.0	40.0	30.0
St. Louis	75.0	75.0	75.0	83.0	30.0
Detroit	100.0	100.0	100.0	95.0	66.0
Eastern	95.0	95.0	85.0	40.0	30.0
Aggregate	79.5	79.5	76.5	51.0	44.5
Average Year to Date	79.5	79.5	66.6	49.6	43.1

Weekly Booking of Construction Steel

FROM THE IRON AGE

	Week Ended Jan. 12, 1937	Jan. 4, 1937	Dec. 15, 1936	Jan. 14, 1936	Year to Date 1937	1936
Fabricated structural steel awards	30,025	19,650	29,920	25,200	49,675	38,850
Fabricated plate awards	3,680	2,725	3,115	31,635	6,405	43,750
Steel sheet piling awards	2,200	1,950	0	0	4,150	3,600
Reinforcing bar awards	6,345	0	4,775	23,700	6,345	26,450
Total Lettings of Construction Steel	42,250	24,325	37,810	80,535	66,575	112,650

. . . .SUMMARY OF THE WEEK. . . .

. . . Ingot production holds at 79½ per cent despite effect of automobile strikes.

o o o

. . . Heavy backlogs sustain operations; railroad and construction bookings gain.

o o o

. . . Carriers issue new inquiries for cars; steel scrap up 50c. at Pittsburgh.

STEEL ingot production is unchanged this week at 79½ per cent of the country's capacity, notwithstanding the automobile strikes. The Pittsburgh district, least affected by suspensions of automobile tonnage, is operating at 80 per cent, one point up from last week and the highest rate for that district in more than six years. There have been gains elsewhere, notably at Youngstown, in southern Ohio and at Birmingham. While there have been declines in some other steel producing centers, they are no more than would normally occur from week to week under most favorable circumstances.

Cold rolled sheets and alloy bars have been the most seriously affected by automobile holdups, but in sheets it has been possible to rearrange rolling schedules and ship to consumers whose requirements otherwise might not have been satisfied until February or March. The most serious effect of the strike upon steel companies will be the postponement of shipments of low-priced automobile tonnage until late in the quarter, whereas it had been the intention to complete such business by Jan. 31.

Exceptionally heavy backlogs in nearly all products, but particularly in sheets, bars, shapes, plates, wire and tin plate, are enabling most companies to maintain their average activity at approximately its recent rate. Unless the automobile strikes extend to other companies or are long drawn out, there may be no appreciable change in steel mill operations during the next few weeks.

The outcome of the automobile strikes is likely to have an important bearing on the possibility of a steel strike within the near future. Steel interests, who are naturally watching the situation with great interest, believe that the Committee for Industrial Organization may have overplayed its hand and will suffer a setback that will prevent similar action at present in the steel industry. Moreover, many lukewarm adherents of the steel workers' union are said to be giving new allegiance to the employee representation plans.

ASIDE from strike developments, the principal concern of the steel industry has been the booking of fairly large tonnages of the heavier products for construction projects and railroad equipment. Structural steel awards reported during the week total upward of 30,000 tons, and new projects are about 33,500 tons. Public utilities are now more conspicuous in new construction work. Work will be begun shortly on the $275,000,000 acqueduct from Delaware River to New York.

A sizable volume of railroad equipment business is in the market, including 3000 hopper cars for the Louisville & Nashville, 2000 gondola cars for the Northern Pacific, 1250 cars for the Clinchfield Railroad, 1000 cars and five locomotives for the Seaboard Air Line and 200 cars for the Chicago & Illinois Midland. The Baltimore & Ohio has ordered 1500 cars, the Nickel Plate 1200, while the Frisco Lines will build 1000 and the Wheeling & Lake Erie 250 in their own shops. A number of small locomotive orders also were placed.

The general run of orders from manufacturing consumers and jobbers since the first of the year has been exceptionally good, considering the heavy volume of buying in November and December. While a good many users will get shipments of steel ahead of the time promised, because of the diversion of tonnage from automobile plants, no heavy inventories are being accumulated. Many buyers are glad to get supplies now, knowing that resumption of automobile manufacturing in full will bring renewed pressure on the mills.

FURTHER price changes have gone into effect. Wrought iron pipe is $6 to $19 a ton higher, depending on the size; cold rolled spring steel and carbon cold rolled strip steel have been advanced $5 a ton, and two mills have announced quantity extras on plates, hitherto not applied on that product. New extras have been adopted on tin plate.

Heavy melting steel scrap has advanced 50c. a ton at Pittsburgh and 25c. at Philadelphia, THE IRON AGE composite reaching a new high of $18.17 since February, 1925.

. . . PITTSBURGH . . .

. . . Ingot rate advances to 80 per cent in the face of automobile strikes.

o o o

. . . Heavy tonnages of plates, shapes and bars sustain operations for district.

o o o

. . . Heavy melting steel scrap 50c. a ton higher on two sales to consumers.

PITTSBURGH—Jan. 12. — The automobile tie-up has not yet affected steel production in this district, and steel ingot output has moved up one point to 80 per cent of capacity, the highest rate attained in the Pittsburgh district for over six years, while the Wheeling district is down one point to 94 per cent.

The sustained high level of operations is due to exceptionally heavy backlogs consisting largely of plate, shape and bar specifications, while the unfilled tonnages for sheets and strip steel, even discounting automotive orders, are still heavier than at any time in several years.

Should the automobile strike extend to other companies, or continue for a prolonged period, producers here obviously would be affected to some extent but not as much as other steel-making centers.

Meanwhile, bookings at first quarter prices in some cases have been much better than expected. Sheet orders last week were in good volume owing to demand from railroad equipment builders and jobbers. Likewise, specifications for manufacturers' wire are much more active than producers had hoped for in view of the exceptionally heavy commitments last month. It is apparent that customers are taking no chances of being caught short and are showing a more liberal tendency in estimating their future known requirements. Consumption of finished steel products is exceptionally good and prevents the accumulation of unduly large inventories at customers' plants.

In practically every case where automobile suspensions have been received, producers have been able to rearrange rolling schedules without any change in the rate of activity.

Final details are being worked out on identified projects which were protected at fourth quarter prices, and it is expected that producers, before the month is out, will have the largest unfilled tonnage of heavy structural steel on their books since 1929.

The raw material markets are firm with a fair-sized volume of new pig iron business being transacted at the recently advanced quotations. Heavy melting steel has developed a stronger tone following two recent sales at 50c. above previous quotations.

Pig Iron

Despite the fact that many customers covered before the price advance on Jan. 1, a fair-sized volume of new business is being transacted. In some cases consumers felt the increase in price was not large enough to warrant too much stocking. Nevertheless, visible stocks at customers' and producers' plants are low. Pressure is being exerted for deliveries. One local steel works furnace has blown out for repairs.

Semi-Finished Steel

Fresh business is light compared with the avalanche of orders which poured in during December. Mills are actively engaged in producing and shipping against heavy backlogs. Much of the new business is coming from consumers who underestimated their future requirements when ordering before the price advance last month.

Bolts, Nuts and Rivets

So far, local producers have been practically unaffected by automobile suspensions. Schedules have been rearranged and producers are busy working off backlogs accumulated before price advances became effective. Heavy movement of material to railroad car builders and railroad repair shops is in progress. While a fair proportion of aggregate business in this district finds its way to the automobile trade, the majority of orders now on the books emanated from miscellaneous sources, railroad repair shops, car builders and fabricating plants. Consequently, bolt and nut production will be exceptionally active throughout January at least.

Bars

Local bar makers have not yet felt the effect of automobile suspensions owing to the heavy volume of unfilled tonnage for other classifications of consumers. Should the holdups increase or continue in effect for any length of time, total production would suffer, but not to the same extent as would be felt in other steel-making centers. Some slowing up of hot-rolled bar shipments to cold finishing fabricators is bound to occur, but this situation will enable the mills to make headway in cutting down exceptionally heavy backlogs. Production difficulties are still coming to light and deliveries in some cases are not rapid enough to suit customers. Although new business continues light, it is a little better than producers expected in view of the heavy commitments placed last month. The influx of reinforcing bar orders previous to the price advance last month has made itself felt in the preparation of finishing mill schedules. Export business is showing improvement.

Reinforcing Bars

Quietness prevails in this market following the heavy placement of orders previous to price advance last month. Last minute details are being worked out on these projects for which bids were in previous to Dec. 23, producers having given jobbers until Jan. 15 to make firm contracts. Producers scrutinized orders very carefully in order to prevent heavy ordering of speculative tonnages.

Cold-Finished Bars

Although the volume of new business is only half as large as that booked during the same period of December, it compares favorably with the early part of Novem-

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Jan. 12, 1937	Jan. 4, 1937	Dec. 15, 1936	Jan. 14, 1936
Rails, heavy, at mill	$39.00	$39.00	$39.00	$36.37½
Light rails, Pittsburgh	38.00	38.00	35.00	35.00
Rerolling billets, Pittsburgh	34.00	34.00	32.00	29.00
Sheet bars, Pittsburgh	34.00	34.00	32.00	30.00
Slabs, Pittsburgh	34.00	34.00	32.00	29.00
Forging billets, Pittsburgh	40.00	40.00	39.00	35.00
Wire rods, Nos. 4 and 5, P'gh	43.00	43.00	43.00	40.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.20	2.20	2.05	1.85
Bars, Chicago	2.25	2.25	2.10	1.90
Bars, Cleveland	2.25	2.25	2.10	1.90
Bars, New York	2.55	2.55	2.40	2.20
Plates, Pittsburgh	2.05	2.05	1.90	1.80
Plates, Chicago	2.10	2.10	1.95	1.85
Plates, New York	2.33	2.33	2.19	2.09
Structural shapes, Pittsburgh	2.05	2.05	1.90	1.80
Structural shapes, Chicago	2.10	2.10	1.95	1.85
Structural shapes, New York	2.305	2.305	2.16¼	2.06¼
Cold-finished bars, P'gh	2.55	2.55	2.35	2.10
Hot-rolled strip, Pittsburgh	2.15	2.15	2.15	1.85
Cold-rolled strips, Pittsburgh	2.85	2.85	2.85	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.80	2.80	2.80	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.90	2.90	2.90	2.50
Sheets, galv., No. 24, P'gh	3.40	3.40	3.40	3.10
Sheets, galv., No. 24, Gary	3.50	3.50	3.50	3.20
Hot-rolled sheets, No. 10, Pittsburgh	2.15	2.15	2.15	1.85
Hot-rolled sheets, No. 10, Gary	2.25	2.25	2.25	1.95
Cold-rolled sheets, No. 20, Pittsburgh	3.25	3.25	3.25	2.95
Cold-rolled sheets, No. 20, Gary	3.35	3.35	3.35	3.05
Wire nails, Pittsburgh	2.25	2.25	2.25	2.40
Wire nails, Chicago dist. mill	2.30	2.30	2.30	2.45
Plain wire, Pittsburgh	2.60	2.60	2.60	2.30
Plain wire, Chicago dist. mill	2.65	2.65	2.65	2.35
Barbed wire, galv., P'gh	2.75	2.75	2.70	2.80
Barbed wire, galv., Chicago dist. mill	2.80	2.80	2.75	2.85
Tin plate, 100-lb. box, P'gh*	$4.85	$4.85	$5.25	$5.25

*Practically the equivalent of previous quotation owing to new method of quoting effective Jan. 1, 1937.

Pig Iron

Per Gross Ton:	Jan. 12, 1937	Jan. 4, 1937	Dec. 15, 1936	Jan. 14, 1936
No. 2 fdy., Philadelphia	$22.76	$22.76	$22.3132	$21.3132
No. 2, Valley furnace	21.00	21.00	20.50	19.50
No. 2, Southern Cin'ti	20.69	20.69	20.44	20.2007
No. 2, Birmingham†	17.38	17.38	16.88	15.50
No. 2, foundry, Chicago*	21.00	21.00	20.50	19.50
Basic, del'd eastern, Pa.	22.26	22.26	21.8132	20.8132
Basic, Valley furnace	20.50	20.50	20.00	19.00
Malleable, Chicago*	21.00	21.00	20.50	19.50
Malleable, Valley	21.00	21.00	20.50	19.50
L. S. charcoal, Chicago	26.54	26.54	26.2528	25.2528
Ferromanganese, seab'd, carlots	80.00	80.00	80.00	75.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.	**$19.75**	$19.25	$19.00	$14.50
Heavy melting steel, Phila.	**17.00**	16.75	15.75	12.50
Heavy melting steel, Ch'go.	17.75	17.75	17.25	13.25
Carwheels, Chicago	18.00	18.00	18.00	13.25
Carwheels, Philadelphia	17.25	17.25	17.25	13.00
No. 1 cast, Pittsburgh	17.25	17.25	16.75	14.25
No. 1 cast, Philadelphia	17.25	17.25	17.25	13.00
No. 1 cast, Ch'go (net ton)	**16.00**	15.50	15.00	12.00
No. 1 RR. wrot., Phila.	15.75	15.75	15.75	12.25
No. 1 RR. wrot., Ch'go (net)	16.50	16.50	15.00	11.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.00	$3.65
Foundry coke, prompt	4.50	4.50	4.50	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	**12.50**	12.00	11.00	9.25
Lake copper, New York	**12.62½**	12.12½	11.12½	9.37½
Tin (Straits), New York	*51.12½*	51.35	52.50	47.75
Zinc, East St. Louis	**6.00**	5.45	5.25	4.85
Zinc, New York	**6.35**	5.82½	5.62½	5.22½
Lead, St. Louis	5.85	5.85	5.25	4.35
Lead, New York	6.00	6.00	5.50	4.50
Antimony (Asiatic), N. Y.	**14.00**	13.75	12.62½	12.62½

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Jan. 12, 1937	2.330c. a Lb.	$20.25 a Gross Ton	$18.17 a Gross Ton
One week ago	2.330c.	20.25	17.92
One month ago	2.274c.	19.73	17.33
One year ago	2.130c.	18.84	13.42

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel HIGH	Finished Steel LOW	Pig Iron HIGH	Pig Iron LOW	Steel Scrap HIGH	Steel Scrap LOW
1937					$18.17, Jan. 12	$17.92, Jan. 4
1936	2.330c., Dec. 28	2.084c., Mar. 10	$19.73, Nov. 24	$18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

ber. This situation is significant as consumers had plenty of time to place specifications at fourth quarter prices. General Motors' suspensions have been felt by producers in this district, but not to as large an extent as generally supposed. Finishing mill schedules have been rearranged so that production is being maintained at practical capacity on orders other than automotive. Discounting the holdups, cold finished bar backlogs on some sizes run as long as eight weeks, with the average being close to six weeks. An increase in suspensions or undue continuation of those now in effect, will eventually make itself felt.

Steel Sheet Piling

Bids were taken on Jan. 11 by the Chicago Park Board for 685 tons of steel sheet piling to be used in the rehabilitation of a pier and jetty, 59th Street, Chicago. This board also took bids for 564 tons of piling for extension and rehabilitation of a pier at Calumet Park, Chicago. Jones & Laughlin Steel Corp. recently was awarded the contract for 1450 tons of piling for jetties at Rehoboth Bay, Del. New business is dull at the present moment, but some large projects are expected to be awarded soon.

Plates and Shapes

Barge inquiries are a little more active, with the Wheeling Steel Corp. asking for quotations on 20 to 25 steel barges, requiring over 2500 tons of plates and shapes. Final details are being worked out on the large volume of railroad car awards made previous to the end of the year. Tonnages involved are exceptionally large and will give much support to the local operating rate throughout the first quarter of this year. Privately financed projects continue to increase in number and significant is the reentry into the market of the utility companies after an absence of five or six years. A contract will be closed locally within the next week or so for five steel cargo barges involving approximately 1200 tons of plates and shapes.

Tin Plate

Demand is holding up well and operations remain at 95 to 97 per cent of capacity. Not only is general line can material in good volume, but packers' specifications in anticipation of a better crop outlook in 1937 are heavier than at the same time last year. The hot mills of a large independent steel company are down this week, owing to repairs and renovations being made at the company's plant. Effective Jan. 1, differentials on the lighter gages of tin plate have been increased and reflect a slight reduction in net prices.

Sheets

Automobile suspensions have not been felt to any extent in this district. Despite a heavy rate of operation, sheet producers find themselves with the heaviest volume of unfilled tonnage in several years. Backlogs on some sizes run as long as eight weeks. Although customers had plenty of advance notice to cover at fourth quarter prices, new business at first quarter prices has been better than producers had anticipated. Railroad equipment manufacturers and jobbers have been in the market in the past week for fair-sized tonnages. Export business has also been showing improvement.

Strip

Unfilled tonnage representing requirements from consumers other than the automotive industry is large enough to enable local strip producers to maintain high operating rates, notwithstanding suspensions from automobile manufacturers. To date these are not of great moment, although a continuation of the automobile tie-up will eventually make itself felt in this market. New business is light and is emanating from miscellaneous sources. Producers of cold-rolled spring steel have announced a $5 a ton advance on high carbon grades effective Jan. 15. Coincident with the increase in cold-rolled strip prices last month, 0.25-0.50 per cent carbon spring steel was advanced $5 a ton. The increase taking effect this week will cover those grades not advanced with regular cold-rolled strip.

Wire Products

Demand for manufacturing wire continues in good volume and some customers who bought heavily last month have been back in the market for steel. Automobile holdups have had little effect in this district. With deliveries pushed forward owing to heavy backlogs, most part makers are reluctant to give up any preferred position they might have on shipping lists. It is realized that when the automotive industry resumes full operations, tremendous pressure will be exerted in order to make up for lost time. Meanwhile, large quantities of material are moving to wood screw and bolt and nut manufacturers.

Tubular Products

Expansion of locomotive building is having its effect on specifications for locomotive boiler tubes, and buying of merchant boiler tubes has shown no perceptible let-down. Heavier oil consumption presages a satisfactory volume of oil-country goods specifications and this item continues to move rather briskly. Wrought iron pipe producers have lowered their discounts, thereby effecting substantial price advances. On ¼ in. to 8 in., inclusive, with the exception of 2 in. buttweld pipe, prices are up $9 a ton; discounts on 2 in. buttweld and standard weight pipe show a $6 a ton advance, and on 9 in. to 12 in., inclusive, the price increase amounts to $19 a ton. While steel pipe producers entered the first quarter with no change in quotations, it is the consensus of opinion that advances might materialize for second quarter business.

Coal and Coke

Unseasonably mild weather has drastically affected demand for domestic lump coal and substantial accumulations have occurred. Producers do not take the situation seriously, as the outlook can change within 24 to 48 hr. On the other hand, orders from industrial users are flowing in freely. Inquiries for domestic coke are exceptionally light due to weather conditions, but the beehive furnace coke market has shown no weakness. Recent sales have substantiated a $4 a ton f.o.b. Connellsville quotation.

. . . Pig iron market unexpectedly active.

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. . . Sales of more than 4000 tons reported.

BOSTON, Jan. 12. — Consumers who had not covered first quarter requirements, or are using pig iron faster than anticipated, were in the market the past week and bought more than 4000 tons. Others, who anticipate a pinch in supplies, signify they will buy shortly. The market, therefore, is unexpectedly active. As is usual around the turn of a year, a few foundries cut down their melt somewhat, but the industry generally is doing well. Many are using more pig iron and less scrap in mixtures.

. . . . CHICAGO . . . .

. . . Mills diverting shipments to other users as motor strike continues.

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. . . Some low-priced orders will now go beyond Jan. 31.

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. . . Railroad equipment demand still a bright spot in markets.

CHICAGO, Jan. 12—Ingot production remains at 77 per cent of capacity despite holdup orders from automobile plants where strikes are now in force. The situation is one in which heavy books and deferred deliveries are permitting mills to divert shipments and thereby hold production on an even keel. This situation is, in fact, a "break" for many users who either underestimated needs or were slow in getting on books, with the result that they have worried considerably about deliveries and manufacturing schedules.

The realinement of steel shipments is helping particularly in the matter of sheets, for which mill books are all but filled for the first quarter. Strike-bound plants which are issuing holdup orders are creating a problem in the matter of shipments of low-priced business, which was to have been cleared off mill books by the end of this month. No declared policy has been announced, but the disposition seems to be one of leniency, which means that some low-priced materials will move to automobile plants after the turn of the month, provided that strike problems are out of the way.

Most major consumers are taking steel as fast as it can be supplied by mills, which, though not operating at peak practical capacity, are, nevertheless, doing about all that the character of business will permit. More railroad equipment orders have been placed and new inquiries are a source of satisfaction to all concerned.

Pig Iron

Sales are dull following a heavy buying period just prior to the last advances in prices. Holdup orders are coming from strike-ridden areas, but from all other directions releases are heavy and January shipments may readily reach a new winter peak. Railroad equipment foundries are gaining momentum and they are making records which have not been attained since the late nineteen twenties.

Wire Products

Production remains at 75 per cent of capacity, which was the high point reached before the automobile strike. Holdup orders from strike areas are common, but because of the delivery situation wire products are being sent in other directions and some opportunity is being given mills to expand stocks of a few lines. New buying of manufacturers' wire is still heavy and the volume of specifications vary from last week only to the extent of the holdups from automobile centers. Jobbers are specifying more freely and they are very close to the time when they will start buying for spring needs. Outlook in the utility field is better and orders are freer. Magnet wire books are well filled and the outlook in this field is excellent. Nails and barbed wire are the slowest of the wire lines, but betterment should come at the first signs of spring.

Bars

Holdup orders resulting from strikes are reaching mills, but, with general deliveries ranging from three to four weeks, shipments can readily be diverted so that rolling schedules are fully maintained. Tractor plants are in full swing and agricultural implement manufacturers are getting off to a fine 1937 start. Machinery manufacturers report heavier orders and the cold drawn bar trade, despite strikes in the automobile industry, continues to specify liberal quantities of hot-rolled bars, and some of these producers have entered new commitments. Many bar users are now taking advantage of the automobile situation and are accepting deliveries which otherwise would have been delayed three to four weeks.

Cast Iron Pipe

Prices remain unchanged at $50 a ton, delivered Chicago, for sizes 6 in. and larger. There is no intimation that foundries will attempt at this time to cover by higher prices the pig iron advance of Jan. 1. Business is dull and has been in that state for about four weeks. This is not unusual at this time of year and it in no way dampens the spirits of sellers who look for a new post-depression peak in 1937. There are excellent underground rumblings concerning larger plans to be undertaken by numerous municipalities. Pipe stocks are large and deliveries of most sizes are prompt.

Reinforcing Bars

Efforts to raise prices are meeting with moderate success on small tonnages. Stable prices probably cannot be had until present stocks of bars, bought at lower prices, have been moved from warehouses. The close of the year added much small-lot tonnage to shop books. Fresh inquiries and the outlook for the next few months are promising. Illinois is more active on its bridge program and Indiana is releasing tonnages for the same purpose. Cook County, Ill., will take bids in a week or so on five bridges, all of which are of good size.

Plates

Railroad car business continues to move forward in attractive volume and mills are receiving a steady flow of orders, not alone from car builders but also from railroad shops, where an unusual amount of new work is being done. The Frisco Lines announce that they will build 600 box cars, 100 coal cars, 250 hoppers and 25 cabooses in their own shops, and the material has been ordered. Dams across the Mississippi River call for plates, and there is a good run of miscellaneous tank business.

Structural Material

Fabricators have good reason to feel better over the outlook as many new inquiries reach them. There is a large amount of bridge work coming into the market, including some railroad structures. A few private buildings are out for figures, and there is a large amount of unclassified work for

jobs requiring less than 100 tons each. New orders in shops are moderately heavier and there is every reason to believe that fabricators' books will grow during the remainder of the winter.

Sheets

Trouble in automobile manufacturing centers is in a measure a "break" for miscellaneous users and mills. With books filled to the end of the quarter, there are any number of users who came into the market late and were considerably worried by the delivery situation. Many of these users are now getting some relief as the result of automobile holdup orders. This matter of delayed acceptances by automobile plants brings up a problem concerning orders which were taken at the old prices and which were to have been delivered in full by the end of this month. No definite policy is as yet stated by mills, though opinion leans toward the attitude that strikes are beyond control of the automobile makers and leniency should govern the situation.

Rails

Operations are still at 50 per cent of capacity, but the rate may soon be advanced despite the fact that mills now plan to make shipments not alone in the first quarter, but also over the following three months. A higher rate of production will come nearer conforming to railroads' desires in the matter of shipments, and then also automobile steel holdup orders permit redistribution of raw steel within integrated mills.

. . . . ST. LOUIS. . . .

. . . L. & N. and M.-K.-T. in market for cars.

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. . . Demand for steel is less active.

ST. LOUIS, Jan. 12.—Railroad business placed with car builders in the St. Louis area was heavy during the week, with other important inquiries pending. Inquiries include: Louisville & Nashville, 3000 50-ton hopper cars and the Missouri-Kansas-Texas, 1250 freight cars, 25 chair cars, three dining cars and one lounge car.

The Missouri Pacific Railway has placed 600 tons of beam spans with Stupp Brothers Bridge & Iron Co. and 300 tons of plate girders with Bethlehem Steel Co. for use at various points along its lines.

Buying of finished steel is not nearly so active as it was before the end of the year, when commitments, especially for standard items used by manufacturers of steel products, were heavy in advance of a price increase.

The pig iron market is quiet, so far as new business is concerned, which was to have been expected. The recent advance of 50c. a ton caused a heavy buying movement before the year ended, and it is believed that most melters in the St. Louis area are covered on their requirements for the first quarter of 1937. The next three months should prove record breaking in shipments. Stove plants in the district have been closed for the usual inventory and repair work, but are expected to resume shortly at a heavy rate of production.

. . . CINCINNATI. . .

. . . Sheet bookings still heavy despite strikes.

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. . . Miscellaneous users are getting better deliveries

CINCINNATI, Jan. 11.—The turn of the year brought no change in the steadily increasing heavy sheet steel bookings. Local interests report weekly orders in excess of mill capacity and delivery protracted to near the end of this quarter. Strikes in the automotive industry are assisting miscellaneous users insofar as sheet deliveries are concerned. Rollings for automobile plants have been partly suspended and material for other consumers substituted. While this helps in one direction temporarily, the heavy demand indicates continued congestion with possible increase when car manufacturers renew specifications.

Ingot steel production is up to about 95 per cent of capacity. Thirty-two open hearths are now in operation with two units each holding one furnace in reserve.

Pig iron demand this quarter is back to actual requirement limits since most melters placed orders prior to Jan. 1 to obtain benefit of lower prices. Shipping instructions are heavy and melters exhibit a definite desire to take all material ordered. Foundry operations are steady at about 75 per cent of capacity.

By-product producers have advanced foundry coke prices 25c. this quarter. These grades are now quotable at $9.75, delivered in Cincinnati. Shipments are slightly off from last quarter levels.

. . CAST IRON PIPE . .

Arkansas City, Kan., plans pipe lines for water system and other waterworks installation. Cost about $39,300. Financing will be arranged through Federal aid.

Newnan, Ga., will take bids soon for pipe for water system extensions and improvements, and other waterworks installation. Cost about $28,000. Wiedeman & Singleton, Candler Building, Atlanta, Ga., are consulting engineers.

North Baton Rouge Water Works District No. 1, North Baton Rouge, La., plans pipe lines for water system in district and other waterworks installation. Cost about $625,000. Financing will be arranged through Federal loan and grant. E. G. Blackwood, Baton Rouge, is engineer.

Bucyrus, Ohio, will take bids soon for pipe line from main reservoir to municipal waterworks station, for trunk water service. Cost about $76,000. Financing has been arranged through Federal aid.

Eau Claire, Wis., will close bids Jan. 21 for pipe for water system, two 1740 gal. per min. turbine-type pumping units with accessories, and other waterworks equipment. Oscar E. Oien is city clerk.

Maplewood, Ore., will take bids soon for pipe for water system and other waterworks installation. Cost about $21,800. Financing has been arranged through Federal aid.

Garland, Utah, has awarded 443 tons for a city pipe line to an unnamed bidder.

Cheyenne, Wyo., plans pipe line for main water supply from city wells to distributing and control station. Cost close to $80,000. Z. E. Sevison is city engineer.

Cook, Min., plans pipe lines for water system and other waterworks installation. Fund of $70,000 will be arranged for this and sewage system. Edward Johnson, Virginia, Minn., is engineer.

Winnsboro, La., will take bids soon for pipe lines for water system and other waterworks installation. Fund of $50,000 has been arranged for this and sewage system. Swanson-McGraw, Inc., Balter Building, New Orleans, is consulting engineer.

Annona, Tex., will take bids soon for pipe for extensions and replacements in water system, including main supply line; also for other waterworks installation. Cost close to $30,000. Municipal Engineering Co., 2906 Maple Avenue, Dallas, Tex., is consulting engineer.

Milford, Del., plans pipe lines for extensions and replacements in water system; also for improvements in waterworks station, including two new pumping units and auxiliary equipment. Bond issue of $105,000 has been voted, to which will be added a Federal grant for $80,000, for this and other municipal improvements.

South Gate, Cal., has awarded 212 tons to American Cast Iron Pipe Co.

Oakland, Cal., has placed 120 tons with Pacific States Cast Iron Pipe Co.

. . PHILADELPHIA . .

. . . Sales offices report more new business than had been expected for this period.

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. . . Strike difficulties have not yet affected this district.

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. . . Operations unchanged at 56½ per cent of capacity.

PHILADELPHIA, Jan. 12.—An unusually large amount of new business is being taken at the new prices considering the volume of orders placed upon order books during November and December. Sellers are generally surprised and gratified; knowing that the end-of-the-year buying spurt was far greater than any that had been seen for many years, they expected much more of a letdown than is being experienced at present. It now appears likely that production will be held at about present levels throughout the first quarter, unless further labor troubles occur. Sheet and strip mills are practically sold out for the entire first quarter, while the new orders coming in, together with present backlogs, will afford plenty of work for makers of other products as well. Specifications continue to be received from the closing of identified projects, and the tonnage still to come from jobs of this type before the Jan. 31 deadline is said to be considerable.

The effects of the strike in the automobile industry have not yet been felt to any extent in this district. The local autobody stamping plants are still in production and are shipping their finished products as fast as possible. District steel mills report no disruption in their schedules as a result of the strike. It is likely, however, that a prolonged continuance of the strike will cause curtailment in production in some plants here. The only sit-down strike of any importance in this area as yet is that in the plant of the Electric Storage Battery Co., Philadelphia, where some 2000 workers are idle.

The shutting down of an open-hearth furnace at Coatesville was balanced by the addition of one unit at Pencoyd, the rate of operations remaining unchanged at 56½ per cent of capacity.

Pig Iron

Sales are light owing to the thoroughness with which customers anticipated the recent price advances. Rising costs and the continued upward trend of the scrap market may be reason for a further boost in the pig iron price, however, according to talk among dealers in this area. According to some sellers here, buyers of pig iron would have been better satisfied had the recent advance been $1 instead of 50c., as it would be easier to pass on a larger advance in the prices of castings.

Sheets and Plates

Orders taken for sheets at the new prices have been surprisingly numerous, in view of the tremendous amount of business placed in this product during the closing months of the old year. Sellers reporting this situation are mostly the smaller mills which are not sold up for the quarter, as is the case with one or two of the larger producers. Some buyers who have placed business with Western mills may receive their orders sooner than they expect owing to rearrangement of rolling schedules on account of holdups of automobile orders. Plates, while less active than sheets, are also being specified more freely. Backlogs in this product range from 10 days to four and five weeks, while sheets, where obtainable at all this quarter, may be had in from three to five weeks.

Shapes and Bars

A good volume of structural awards was reported this week, with industrial expansions and highway work accounting for much of the activity. A grandstand in Newark, Del., for the Delaware Steeplechase and Racecourse, requiring about 680 tons of shapes, was awarded to Belmont Iron Works. This company also secured the contracts for a highway bridge in Clinton County, Pa., requiring 135 tons of shapes, and 525 tons of shapes for two buildings at the Eddystone plant of General Steel Castings Co. The Reading Steel Products Co. was awarded 340 tons of shapes for work at the Reading plant of the Wilson Products Co. Bids were taken last week on a number of highway bridge projects throughout the state, totaling in all about 1700 tons. No awards have been announced. Little activity was reported in reinforcing bars this week, although the award of about 700 tons of bars for two Philadelphia schools, bids on which were taken last week, is expected shortly.

Wire Products

New business is light, although some recent activity has been noticed in nails. All prices are firm and buyers are constantly pressing for earlier shipping dates.

Imports

The following iron and steel imports were received here during the past three weeks: 103 tons of ferrochrome from Japan; 202 tons of sponge iron, 53 tons of steel tubes, 47 tons of steel forgings, 43 tons of cold drawn steel wire, 38 tons of steel billets, and 74 tons of steel bars from Sweden; 12 tons of steel bars, 13 tons of steel bands, 102 tons of steel blooms and 72 tons of structural shapes from France; 447 tons of steel bars, 22 tons of diamond plates, 35 tons of steel sheets, 180 tons of steel bands and 371 tons of structural shapes from Belgium; 5400 tons of manganese ore from the Gold Coast; 2300 tons of chrome ore from Cuba; 1152 tons of pig iron from British India, 3108 tons of pig iron from Russia, and 100 tons of ferromonganese from Norway.

New Open Hearths At Lackawanna Started

BETHLEHEM STEEL CO. has started the first of its new 150-ton open hearth furnaces at its Lackawanna, N. Y., plant. By the end of the week two more may be put into service. There are six new furnaces, which may all be in operation within two weeks, giving that plant additional steel-making capacity of 900 tons a day. Construction of the new furnaces was begun in 1929, but work was abandoned during the depression and resumed last year, when requirements of the new sheet-strip mill caused a heavier load on the open-hearth furnace department. The Lackawanna plant now has 30 open hearth furnaces.

. . . *Heavy backlogs keep southern operations high.*

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. . . *Business sufficient for several months.*

BIRMINGHAM, Jan. 12.—Heavy backlogs will maintain iron and steel operations at a high and steady point for some months. Producers entered the new year liberally stocked with unfilled tonnage and can look forward comfortably to the next several months. Their position is further reinforced by the prospects of additional new business that is pending. The holidays slowed up shipments to some extent, but these are now climbing back to the expected rate. Steel buyers have again begun to specify freely against commitments. This activity is spread among all lines of steel.

The pig iron market is rather quiet on account of the general buying movement that took place just before the price was advanced $1 a ton on Nov. 24 and when it was raised another 50c. the latter part of December. The present base price is $17.38. Most of the larger melters have bought sufficient iron to last them through the first quarter and beyond. A few scattering sales are now being made at the present price, but the volume of new business will be limited for some time to come.

Open hearth operations are varying from 16 to 17 units. Last week 16 were worked, this week there will be 17. Tennessee Coal, Iron & Railroad Co. has scheduled eight out of nine at Fairfield and four out of nine at Ensley; Gulf States Steel, five out of six at Gadsden. Blast furnace operations are unchanged, with 15 active stacks.

Steel fabricators are busy with accumulated orders and can schedule operations ahead for several months. Ingalls Iron Works has booked 600 tons for the new plant of the Owens-Illinois Glass Co. at Los Angeles. Nashville Bridge Co. will fabricate 125 tons for the Bayou LaCombe bridge in Louisiana. Nashville Bridge Co. has also received an order for five barges. These will be fabricated and assembled in the Nashville plant.

It is expected that some of the new freight cars now pending will be placed with the Bessemer plant of the Pullman-Standard Car Mfg. Co.

Last week Montgomery, Ala., opened bids on waterworks extensions. U. S. Pipe & Foundry Co. was low bidder on 2500 to 3000 tons of cast iron pipe and fittings, with a bid of $115,595.50. Chicago Bridge & Iron Co. was low bidder for a steel reservoir, with a bid of $59,985. Mueller Co., Decatur, Ill., was low bidder for valves and hydrants at $9,722.25.

The plan of reorganization for the Woodward Iron Co., presented to the Federal Court in Birmingham on Dec. 23, will come up for hearing on Jan. 29.

. . . *Several awards of steel for building projects.*

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. . . *Pig iron backlogs and shipments heavy.*

BUFFALO, Jan. 12.—A Buffalo fabricator obtained the contract for the fabrication of 1500 tons of reinforcing bars and sheet piling for the latest phase of the Buffalo sewage disposal plant development, and will fabricate 400 tons of structural steel for the same job.

Another Buffalo concern will fabricate 100 tons for a building for the Niacet Chemical Co., Niagara Falls. It is understood that this concern also received contracts for three plants for the National Gypsum Co., one in Ohio and another in Michigan already erected and one in Texas to be built.

A 170-ton structural addition for the Union Carbide Co. of Niagara Falls has been awarded locally.

Surprisingly good business is reported in small reinforcing bar tonnage. While January and February are usually lean months, it is probable that these months this year will be equal to the past three or four months.

With new prices now in effect on pig iron, producers find that they have heavy backlogs, and shipments are steady and up to expectations.

Bethlehem Steel has 24 open hearths in operation, Republic Steel, six, and Wickwire-Spencer, two.

. . . *Western trade hopeful despite long strike.*

° ° °

. . . *Many projects await labor settlement.*

SAN FRANCISCO, Jan. 11.—Despite the two-months-old maritime strike, all branches of the Pacific Coast steel industry face the new year with optimism. Many prospective projects await only the clearing away of labor difficulties to become active.

One of the larger contemplated projects is a $5,000,000 flood control plan at Los Angeles. Work, as approved, calls for approximately 83,600 ft. of 36 to 69-in. steel pipe to be laid in the suburbs of Los Angeles.

Present activity is slight, though a good many small jobs keep mill production at a fairly high level. Only the cast iron market has remained active during the past month, seemingly less affected by labor trouble.

Awards last week were small, with Bethlehem Steel Co. taking three reinforcing bar jobs totaling 745 tons in the San Francisco Bay area and Blue Diamond Steel Corp. taking three bar projects in Los Angeles aggregating 367 tons. Structural steel awards were few and scattered.

Jobbers had little business last week, due largely to the general price raises effective here last week.

Standard Tube Co. Expands Plant

A MARKED increase in the use of tubing by the automobile, bicycle, air conditioning, refrigeration, farm implement and metal furniture industries has caused the Standard Tube Co., Detroit, to double its plant capacity, according to a statement by its president, George B. Storer.

A new forged-seamless tube mill will be put into operation on Feb. 1. This will represent a 50,000 sq. ft. addition to the company's Oakland Ave. plant. The company will then be in position to produce all types of steel tubing, forged, seamless, welded and butted. The opening of the new mill will add several hundred workers to the company's payroll.

. . . CLEVELAND . . .

. . . Operations not materially affected by automobile company suspensions.

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. . . Mills are now able to take care of other customers with quicker deliveries.

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. . . New quantity differentials are adopted by two plate mills.

CLEVELAND, Jan. 12.—Ingot output in the Cleveland-Lorain district dropped three points this week to 76 per cent of capacity, but in the Youngstown district there was a gain of two points to 75 per cent of capacity.

While shipments of considerable steel by Ohio mills, particularly in sheets and strip, have been held up by the General Motors strike, mills have readjusted their schedules and are producing material for other industries from which they have a good backlog of orders. This is enabling mills to advance their shipping dates for steel for which there has been pressure for deliveries. Finishing mills generally are maintaining recent operations, with the exception of some of the hot strip mills, which have not had as much backlog in orders as the sheet mills.

Aside from total suspensions by the local Fisher Body plant, little steel is being held up by consumers in the motor car field in this territory, most of the business of northern Ohio parts makers being from other than General Motors plants. The question has arisen as to whether mills will ship after Jan. 31 steel sold at the fourth quarter prices, but the delivery of which has been unavoidably suspended. Some business is being taken at the first quarter prices in bars and sheets, but the volume is not large. Merchant and oil country pipe is in good demand.

Pig Iron

Several small lot sales have been made at the 50c. a ton price advance. Shipments continue heavy, although a few small lots have been held up by automobile parts foundries. As the General Motors foundries carry large stocks of pig iron the suspension of these foundries is having no effect on shipments. The heating industry is showing renewed activity and is taking more iron than recently. Specifications are good from agricultural implement foundries.

Bars, Plates and Shapes

Shipments of bars have been held up in very few cases by the labor troubles in the motor car industry and, with heavy backlogs from miscellaneous consumers, mills are maintaining good operations. Some new tonnage is being entered at the first quarter price. The structural market is quite active both in new awards and in the placing of specifications for structural shapes for construction work, for which price protection was recently taken. Bethlehem Steel Co. has been awarded 1100 tons for a building for the National Carbon Co., Clarksburg, W. Va., the Austin Co., 640 tons for a building for the Goodyear Tire & Rubber Co. in Jackson, Mich., and miscellaneous awards of about 500 tons were made during the week.

Plates

New quantity extras and other changes in the extra lists on plates have been made by two mills and others are expected to make similar changes. Quantities from 4000 to 6000 lb. now carry a 25c. extra; from 2000 to 4000 lb., 75c. extra and under 2000 lb., $1.25 extra. No deductions are made for lots in excess of 6000 lb. A new thickness extra is provided for plates over 2 in. thick not calling for physical tests. These are 15c. for 2 in. to 3 in. inclusive; 20c. for 3 in. to 4 in. inclusive and 25c. for over 4 in. If the silicon extra of 25c. or more is applicable, these extras do not apply. Heavy gage extras have been increased for plates over 2 in. thick for which physical tests or melt tests are specified. An extra is provided for specified flame cutting tolerances closer than standard. There is also an extra of 0.05c. for normalizing test pieces. A 15 per cent advance is made to the list price for forming heads.

Sheets

Suspension of shipments by some consumers in the motor car field has caused little, if any, curtailment in sheet mill operations, but has resulted in improved deliveries of some grades, which is proving helpful to consumers in diversified industries who have been crowding mills for shipments. Not only are these getting earlier deliveries, but some who were to pay the new prices on sheets ordered in December that mills could not deliver before February may be able to secure January shipments at the old prices. Aside from the local Fisher Body plant, suspensions have been very light in this territory. Demands from refrigerator, stove, barrel and other miscellaneous consumers are heavy.

Strip Steel

Shipments to General Motors parts making plants have been suspended following the shutting down of these plants. Mills are substituting other orders on their ruling schedules. Deliveries to other automobile plants and to miscellaneous industries are proceeding as usual. New demand is slack.

Bolts and Nuts

Manufacturers have a heavy backlog in orders taken at the old prices and some do not expect to be able to complete shipments against these orders before the end of the month. Some suspensions have come from automobile plants but these so far are not interrupting operations. Same sales have been made at the new first quarter prices.

Warehouse Business

New quantity extras that will prove beneficial to larger buyers were adopted by warehouses with the price advances of Jan. 1 that reflected the advance in mill prices. Warehouses have based the revised extras closely on the costs of handling lots of various sizes. The base price now applies to lots of 400 to 4000 lb. Lots from 4000 to 10,000 lb. that formerly also carried the base price are now subject to a 10c. per 100 lb. discount. The discount on lots from 10,000 to 20,000 lb. is increased from 10c. to 15c. The extra on less than 400 lb. lots is unchanged at 50c.

. . . Good prospects for 1937 in Dominion industry.

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. . . Railroads expected to place large orders.

TORONTO, Jan. 12.—The Canadian iron and steel industry opened the new year well entrenched with orders and at the same time has before it prospects for other substantial business, both from domestic sources and for foreign consumption. During the past year plant operations maintained the highest rate since 1929, and present indications are that the industry will run to a new high record during the current year.

During the latter part of 1936 the Dominion Steel & Coal Co., Sydney, N. S., reached an operating rate of approximately 95 per cent of capacity, while high rates were achieved by the Steel Co. of Canada, Ltd., Hamilton, and the Algoma Steel Corp., Sault Ste. Marie, Ont. Officials of Algoma Steel state that it is expected that operations for the last half of its fiscal year, which ends April 30, will show substantial improvement. Orders for structural and automotive steel are increasing and the company now is working on small rail orders.

Canadian railroads are expected to place heavy orders for rails and equipment soon, with some interests estimating expenditure of approximately $15,000,000 each for the two major companies. Additional contracts from Great Britain are in prospect and Canadian steel interests also look for substantial business from the British Dominions.

Pig iron producers predict a sharp increase in production for 1937 and state that new orders again are moving back to the high rate maintained previous to the year-end holidays. Sales for the past week, however, were hampered to some extent by inventory taking by a number of companies, but reached a total of approximately 800 tons. A few of the larger melters have covered for first quarter and others are getting ready to close. Spot sales are improving and a large number of melters have cleaned up stocks and now are entering the market for new supplies. Production is sustained and imports continue light with local blast furnace representatives reporting little or no competition from the United States. Prices are firm and unchanged with higher levels in prospect.

Weyerhaeuser Timber Co. has ordered two locomotives of 2-6-6-2 type from Baldwin Locomotive Works.

Anaconda Copper Mining Co. is inquiring for 200 5-ton ore cars.

Dominion Steel & Coal Corp., Ltd., has ordered 100 hopper cars from Eastern Car Co, Ltd.

Godfrey L. Cabot, Inc., has bought 10 special 35-ton hopper cars from Pressed Steel Car Co.

Wheeling & Lake Erie will build 250 60-ton hopper cars in its own shops.

Phelps-Dodge Corp. is inquiring for 25, 50 or 100 70-ton air dump cars.

Michigan Limestone & Chemical Co. is inquiring for 30 30-cu. yd. air dump cars.

Virginia Smelting Co. has ordered one 40-ton tank car from General American Transportation Corp.

Clinchfield is inquiring for 800 hopper cars, 200 50-ton gondola cars and 250 50-ton box cars.

Chicago & Illinois Midland is in the market for 100 50-ton hopper cars and 100 70-ton gondola cars, and has ordered two switch engines from Lima Locomotive Works.

Chesapeake & Ohio has ordered 25 70-ton dry bulk cars from American Car & Foundry Co., 50 40-ton stock cars from Greenville Steel Car Co., and 10 horse express cars from St. Louis Car Co.

New York, Chicago & St. Louis has ordered 500 50-ton gondola cars and 25 70-ton dry bulk cars from American Car & Foundry Co., 500 box cars from General American Transportation Corp., 100 auto-furniture cars from Ralston Steel Car Co. and 75 50-ton hopper cars from Pullman-Standard Car Mfg. Co.

Pere Marquette has ordered 25 caboose cars from Magor Car Corp. and 10 baggage-express cars from St. Louis Car Co.

Chicago & North Western has ordered 23 Challenger type coaches from Pullman-Standard Car Mfg Co.

Louisville & Nashville is inquiring for 3000 50-ton hopper cars.

Missouri-Kansas-Texas is in the market for 25 chair cars, three dining cars and one lounge car.

Boton & Maine has ordered 20 air conditioned coaches from Pullman-Standard Car Mfg Co., Worcester, Mass., and will modernize 30 coaches in its own shops at Concord, N. H.

Maine Central will modernize five coaches in its shops at Waterville, Me.

Wabash is in the market for 200 hopper cars.

Northern Pacific is inquiring for 2000 gondola cars.

Baltimore & Ohio has ordered 1500 gondola cars from Bethlehem Steel Co.

New Orleans Belt Railway has ordered three 900-hp. diesel locomotives from Baldwin Locomotive Works.

Frisco will build 600 box cars, 100 coal cars, 250 hoppers and 25 cabooses in own shops Material has been ordered.

Receivers of Seaboard Air Line have applied for authority to issue $2,500,000 in equipment trust certificates to purchase five locomotives from Baldwin Locomotive Works and 1000 box cars, six passenger cars and four passenger and baggage cars from Pullman-Standard Car Mfg Co. Total cost of this equipment will be about $3,391,000.

American Car & Foundry Motors Co. has received an order from Capital Transit Co., Washington, for 23 motor coaches powered with Hall-Scott horizontal engine. This is the 10th repeat order from this company.

RAILS AND TRACK SUPPLIES

Boston & Maine has bought 6000 tons of rails and accessories from Bethlehem Steel Co.

Maine Central has placed 3500 tons of rails and accessories with Bethlehem Steel Co.

New York, New Haven & Hartford has purchased 2500 tons of rails from Bethlehem Steel Co. and 2500 from Carnegie-Illinois Steel Corp.

Chennel Gas Co., Dickinson, Tex., plans welded steel pipe line from Dickinson Bayou to point near Kemah, Tex., crossing Clear Creek, for natural gas transmission.

Ottumwa Gas Co., Ottumwa, Iowa, plans 3-in. welded steel pipe line for natural gas transmission to municipality, including steel pipe lines for distribution. Cost close to $110,000. George Holmes is general manager.

Peppers Gas Co., Enid, Okla., plans 8-in. welded steel pipe line in part of North Kelley Street, Oklahoma City, for crude oil transmission. Cost over $70,000.

Pennsylvania Gas Transmission Co., Pittsburgh, recently organized by J. French Robinson, 516 Edgerton Place, and associates, plans operation of natural gas system in nine eastern counties in Pennsylvania. Company is arranging for purchase of steel pipe lines of Manufacturers' Light & Heat Co., Union Trust Building, Pittsburgh, in area noted, and will build additional welded steel pipe lines for main gas transmission and distribution. It is proposed to purchase natural gas from Maryland Gas Transmission Co. and will build welded steel pipe line to connect with such system. Entire project will cost close to $2,000,000. H. C. Cooper, Sewickley, Pa., and T. B. Gregory, Emlenton, Pa., are interested in new company, of which F. B. Flahive, 61 Broadway, New York, has been elected treasurer.

Edcouch, Tex., plans steel pipe line in Rio Grande Valley area for natural gas transmission to municipality. Cost about $25,000. Bond issue in such amount has been approved.

Moundridge, Kan., plans steel pipe line system for municipal gas distribution. Bond issue of $35,000 has been voted for project.

Stanolind Oil & Gas Co., Tulsa, Okla., has awarded contract to Williams Brothers Corp. for a 20-mile, 8-in. Lindewelded steel pipe line from Webster Station to Texas City, Tex.

Alaka Oil Co., Ltd., 57 Queen Street, Toronto, has let contract to Ontario Pipe Supply & Construction Co., 42 James Street North, Hamilton, Ont., for new welded steel pipe line from Brownsville to Ingersoll, Ont., about 12 miles, for oil transmission. Cost over $100,000.

Norfolk & Middleton Gas Co., Tillsonburg, Ont., plans welded steel pipe line from Tillsonburg to Straffordville, Ont., for natural gas transmission. Cost close to $100,000. A. B. Holmes is general manager.

. . . . NEW YORK. . . .

. . . Delivery situation eases, owing to automobile suspensions.

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. . . New buying in fair volume, though below recent average.

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. . . Work to be started on $275,000,000 water tunnel from Delaware River.

NEW YORK, Jan. 12.—Since the beginning of the year steel business has returned to the "normal" volume that existed before the heavy buying movement of the last two months of 1936. Only a few weeks ago some steel companies were turning down orders for sheets, because they could not hope to complete shipments during the first quarter of the orders already on their books, but the suspensions by the General Motors Corp. have eased the situation somewhat, although late February or early March represent present shipping promises. Those companies that sell the least to the automobile industry are at present in the most comfortable position, as their holdups have been few. For the others, the General Motors strike is for the moment a "breathing spell," although a prolongation of the strike for another two or three weeks might bring an entirely different picture, as during that time some of the mills will have caught up appreciably on shipments of miscellaneous orders. Some steel users are getting shipments sooner than they expected, but there is no complaint on that score because it is generally realized that full resumption of automobile manufacturing schedules will bring renewed pressure on the mills.

In the heavier products, which are, of course, affected little or not at all by the automobile situation, there are good prospects for further additions to tonnage on the books. Railroad equipment buying has lessened, but there is still business to be placed. The Northern Pacific, for example, has asked Eastern car builders to bid on 2000 steel gondola cars. The Baltimore & Ohio has ordered 1500 gondolas from Bethlehem Steel Co. A good many construction projects, on which price protection was obtained prior to Dec. 31, are now shaping up so that formal contracts can be signed before the end of this month.

Bids were taken today (Tuesday) by the Board of Water Supply of New York on the first contract in the $275,000,000 water tunnel to be constructed from Delaware Water Gap. About 1500 tons of structural steel and reinforcing bars, approximately half of each, will be required for shafts that are to be the first part of the job. More of these shafts will be required for underground digging along the route of the water tunnel. Bids will be taken Feb. 2 on fabricated structural steel for the Midtown-Hudson tunnel; about 7500 tons will be required. Last week bids were taken on section No. 5 of the New York Central's highway on the West Side, New York, requiring about 1850 tons of fabricated structural steel, and on Tuesday of this week, bids were taken on section No. 6, calling for about the same amount.

More export business is being offered than American mills are willing to take, even though in some instances prices higher than those ruling for domestic delivery can be obtained. Japan is seeking 100,000 tons of American iron ore.

Pig Iron

Extensive coverage by buyers before application of higher prices for pig iron is causing a lull in new business. Shipments, however, continue to reflect active consumption, though undoubtedly some iron is being stocked. All grades of iron were increased 50c. a ton, effective for first quarter delivery, the announcement not previously having been made in this section owing to omission of market reports in last week's issue. Producers who failed to ship all their fourth quarter tonnage by Dec. 31 expect to have this business cleared up within about two weeks.

Reinforcing Steel

Construction jobs figure prominently in the list of reinforcing bar awards this week. Igoe Brothers were awarded 375 tons of bars for another section of the Sixth Avenue subway, while the Truscon Steel Co. secured the contract for the New York Central viaduct on the West Side elevated highway, which involved about 260 tons of bars. A project at Lakehurst, N. J., requiring 400 tons of reinforcing steel, was awarded to Igoe Brothers. In addition, inaugural work at the site of the Worlds Fair in Flushing, N. Y., is demanding tonnages of bars occasionally, while highway jobs are an important factor. Many of these projects would not be out at this time, were not the weather unseasonably mild. A comparatively small amount of bars is expected to be required by the new Delaware aqueduct project of the New York Board of Water Supply. Prices are said to be stiffening and a determined effort is being made by sellers to maintain the new prices.

REINFORCING STEEL

. . . Awards of 6345 tons —1925 tons in new projects.

AWARDS

Lakehurst, N. J., 400 tons, to Igoe Brothers.

New York, 375 tons, section of Sixth Avenue subway, to Igoe Brothers.

New York, 260 tons, New York Central viaduct, west side elevated highway, to Truscon Steel Co., through Crimmins Contracting Co.

Boston, 224 tons, court house addition, to Concrete Steel Co.

Dartmouth-Westport, Mass., 112 tons, State bridge, to Morrison-Stevens Co.

Concord, N. H., 100 tons, State bridge, to Concrete Steel Co.

New Haven, Conn., 250 tons, telephone building, to Concrete Steel Co.

Buffalo, 1500 tons, sewage disposal plant, to Bethlehem Steel Co.

Hammond, Ind., 120 tons, civic auditorium, to an unnamed bidder.

Oshkosh, Wis., 350 tons, court house, to Cook & Brown, local.

Stevens Point, Wis., 260 tons, high school, to Joseph T. Ryerson & Son, Inc.

Clinton, Iowa, 660 tons, dam across Mississippi River, to Inland Steel Co.

Sacramento, 100 tons, warehouse, to Bethlehem Steel Co.

Oakland, Cal., 167 tons, schedule A, Broadway low level tunnel, to Bethlehem Steel Co.

San Francisco, 478 tons, warehouse, to Bethlehem Steel Co.

Los Angeles, 119 tons, bridge over Snow Creek, to Blue Diamond Steel Corp.

Los Angeles, 148 tons, Raymond Avenue school, to Blue Diamond Steel Corp.

Los Angeles, 100 tons, Hobart Boulevard school, to Blue Diamond Steel Corp.

Los Angeles, 615 tons, Hollenbeck junior high school, to Blue Diamond Steel Corp.

NEW REINFORCING BAR PROJECTS

McComb, Ill., 280 tons, State training school.

Cook County, Ill., tonnage not stated, five bridges.

Detroit, 1500 tons, sewer.

Reno, Nev., 144 tons, two bridges; bids opened.

. . . Continental prices raised, also British sheet prices.

LONDON, Jan. 12.—Pig iron delivery arrears were reduced slightly owing to the holidays, but further large imports during 1937 will undoubtedly be necessary. Prices of basic iron have advanced 7s. 6d.

Steel departments are working at full pressure, but semi-finished steel, sections, wire rods and thin sheets are almost unobtainable. A further expansion of demand is expected, but is hindered by coke and ore shortages.

Continental iron and steel market is active, but owing to the growing shortage sales are being restricted or suspended entirely. Belgian home prices were raised 10 per cent. The International Wire Rod Cartel has been prolonged provisionally until Feb. 1 pending an agreement of definite prolongation. For delivery after March, British prices on black sheets are raised 10s. and galvanized sheets 20s. Continental gold prices were raised an average of 5s., but no details are yet available.

Carnegie-Illinois Steel Files Answer to Complaint of SWOC to Labor Board

WASHINGTON, Jan. 12.—The Carnegie-Illinois Steel Corp. struck out vigorously in support of the three-year-old plan of employee representation before the National Labor Relations Board with the filing of a formal answer Saturday to the complaint lodged by the board in December.

This answer came as a prelude to the reopening yesterday of the Labor Board hearing on accusations of the Committee for Industrial Organization, which seeks to outlaw the plans and impose a closed shop upon steel workers.

The lengthy complaint, which attacked the plans through numerous allegations of company domination, was answered in each particular, but the principal point disclosed was a confirmation that the employees' plan will be supported by the Carnegie-Illinois Steel Corp. through every proper legal means.

The men, the answer stated, now as always, "* * * are free to select any form of collective bargaining that they desire for negotiating purposes."

It emphasized that a vast majority of the employees had adopted the plans, which vary in substance at the several mills as employees have amended them. In thus adopting and amending them, the employees have thus accepted them as a most effective means of collective bargaining.

The company declared that each of the 27 separate plans and the Pittsburgh district general council constituted individual labor organizations as defined by the National Labor Relations Act and thus were proper and "necessary" parties to the current proceedings. Failure to include these in the complaint and notice of hearing was termed a violation of their constitutional rights which in itself invalidated the Labor Board's actions.

An accusation that the company makes newly hired workers "subject to" the plan in effect at their mills brought the response that in addition to handing them copies of the plan, they also received copies of various safety rules and are informed of provisions for group insurance.

The company admitted without comment that "it does not instruct its officers or agents to advise newly hired employees of the existence of a labor organization known as Steel Workers Organizing Committee or of a labor organization known as Amalgamated Association of Iron, Steel and Tin Workers of North America."

In reply to a charge that the company refused to negotiate a wage question with a committee chairman, the answer declared that no request for such discussion was received, and that plan rules provide for open rather than secret negotiations in all matters for adjustment.

The company made no secret of the fact that it had borne certain necessary expenses in the administration of the plans.

These were, payment of the men for time necessarily lost from work attending meetings, payment of a flat sum of $1.50 for expenses in getting to and from meetings, actual out-of-pocket expenses while atending meetings, eight hours' regular pay to delegates attending meetings of the Pittsburgh district general council regardless of whether the men otherwise would be working, payment of costs of printing ballots and election posters or notices, payment of costs of printing copies of the plans of representation, payment of wages to necessary election officials providing the employees with a stenographer for their meetings and furnishing necessary stationery.

The answer reiterated previous legal assertions that the National Labor Relations Act is unconstitutional, replied to the detailed charges of the Labor Board without admitting its jurisdiction, and closed with another formal motion for dismissal of the complaint.

Machine Tool Sales At All-Time Record

MACHINE tool sales set a new all-time record in December with an index number of 260.6, according to a preliminary report of the National Machine Tool Builders Association. The domestic index for December was 206.8 and the foreign 53.8. Of the total volume, 79.3 was domestic and 20.7 was foreign.

The total index figure for November was 147.1. The previous record was in January, 1919, with an index number of 231.4. The peak month during the period preceding the depression was in 1929, with an index number of 186.3.

. . .NON-FERROUS. . .

. . . *Domestic copper raised to 12.50c. Valley basis.*

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. . . *Spelter placed $11 a ton above former level.*

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. . . *Lead firm but less active; tin weaker.*

NEW YORK, Jan. 12.—Pressure to raise domestic copper prices, owing to further advances in the foreign market, caused producers here to boost quotations ½c. a lb. yesterday to a new basis of 12.50c., delivered Connecticut Valley, for electrolytic grade. The possibility of a larger increase existed, but producers, concerned with the speculative nature of foreign purchases, were loath to take the step. Tenseness still clings to the situation, however, and, with copper for export priced this morning at from 12.70c. to 12.75c., European base ports, a further increase in domestic quotations may become necessary. Offerings continue restricted, with no more metal available at 12.50c. than at the former 12.00c. level. Domestic sales in January through yesterday aggregated 19,965 tons.

Zinc

Stimulated by recent advances abroad, domestic spelter prices began moving up last week, the market advancing $3 a ton on Jan. 8 to 5.60c. a lb., East St. Louis basis. Resuming this movement yesterday, prices were further boosted by $4 a ton, and by afternoon trading today were up still another $4 a ton. At this point, the market is accordingly quotable at 6.00c. a lb., East St. Louis, or $11 a ton above its position prior to Jan. 8. For the most part, advances were made in successive steps of $2 a ton, with two such boosts occurring to a day. Bullish foreign influence coincided with statistical strength to lend the market its buoyancy. During December refined stocks decreased 12,771 tons, shipments rose 2714 tons to 59,821 tons and production expanded by 1308 tons to 47,050 tons. Prime Western stocks alone declined 6847 tons. Total stocks at Jan. 1 of 44,756 tons equaled less than a month's needs. The situation is such that producers can put the price where they please.

Lead

Pig lead quotations are unchanged at the 6.00c. a lb., St. Louis basis, and volume of buying has receded. The undertone continues to display plenty of strength, however, as consumption is sustained and producer supplies accordingly are believed still to be declining.

Tin

Trading continued quiet during the week, but with occasional sales to professional interests. Price fluctuations were mild, though spot Straits at New York is easier today at about 51.12½c. a lb. Standard prices in London this morning were £230 10s. and £231 10s., prompt and future, respectively. The Eastern quotation was £233 2s. 6d.

Non-Ferrous Averages

The average prices of the major non-ferrous metals for December, based on daily quotations in THE IRON AGE, are as follows:

Electrolytic copper, Conn.*..	10.995c. a lb.
Lake copper, Eastern delivery	11.120c. a lb.
Straits tin, spot, New York..	51.843c. a lb.
Zinc, East St. Louis.....	5.269c. a lb.
Zinc, New York.....	5.644c. a lb.
Lead, St. Louis.....	5.400c. a lb.
Lead, New York.....	5.550c. a lb.

*Price ¼c. lower in New York.

The Week's Prices. Cents Per Pound for Early Delivery

	Jan. 5	Jan. 6	Jan. 7	Jan. 8	Jan. 9	Jan. 11	Jan. 12
Electrolytic copper, Conn.*	12.00	12.00	12.00	12.00	12.00	12.50	12.50
Lake copper, N. Y.....	12.12½	12.12½	12.12½	12.12½	12.12½	12.62½	12.62½
Straits tin, spot, New York	50.95	51.00	51.35	51.30	....	51.30	51.12½
Zinc, East St. Louis....	5.45	5.45	5.45	5.60	5.60	5.80	6.00
Zinc, New York.....	5.80	5.80	5.80	5.95	5.95	6.15	6.35
Lead, St. Louis.....	5.85	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00	6.00

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin 99 per cent plus 19.00c.-21.00c. a lb. delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 17.00c. a lb. delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 14.00c. a lb., New York.
Quicksilver, $88.50 to $92.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 13.37½c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	52.50c. to 53.50c.
Tin, bar	54.50c. to 55.50c.
Copper, Lake	13.75c. to 14.75c.
Copper, electrolytic	13.75c. to 14.75c.
Copper, castings	13.00c. to 14.00c.
*Copper sheets, hot-rolled	19.37½c.
*High brass sheets.	17.25c.
*Seamless brass tubes	20.00c.
*Seamless copper tubes	20.37½c.
*Brass rods	15.25c.
Zinc, slabs	7.00c. to 8.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.75c.
Lead, American pig.	7.00c. to 8.00c.
Lead, bar	8.00c. to 9.00c.
Lead, sheets, cut	8.75c.
Antimony, Asiatic	15.00c. to 16.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	31.50c. to 32.50c.
Babbitt metal, commercial grades	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33⅓ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.37½c.
Tin, bar	57.37½c.
Copper, Lake	13.12½c. to 13.25c.
Copper, electrolytic	12.87½c. to 13.12½c.
Copper, castings	12.37½c to 12.62½c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig.	6.50c. to 6.60c.
Lead, bar	9.25c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade.	21.50c.
Babbitt metal, high grade	59.37½c.
Solder, ½ and ½	33.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.37½c.	10.12½c.
Copper, hvy. and wire	9.25c.	9.75c.
Copper, light and bottoms	8.25c.	8.75c.
Brass, heavy	5.75c.	6.37½c.
Brass, light	4.87½c.	5.62½c.
Hvy. machine composition	8.25c.	8.75c.
No. 1 yel. brass turnings	6.87½c.	7.37½c.
No. 1 red brass or compos. turnings	7.62½c.	8.12½c.
Lead, heavy	5.00c.	5.37½c.
Sheet aluminum	13.25c.	14.75c.
Zinc	3.00c.	3.37½c.
Cast aluminum	12.12½c.	13.25c.

IRON AND STEEL SCRAP

. . . Composite price 25c. higher at $18.17 a gross ton.

o o o

. . . Heavy sales reported at Pittsburgh; export markets more active.

PITTSBURGH prices on steelmaking grades are 50c. higher on the strength of several substantial sales, and No. 1 in eastern Pennsylvania has been advanced 25c. as a reflection of revived export activity. These two changes have been reflected in a 25c. rise in the composite figure, which is now $18.17 a gross ton. Markets all over the country are showing a quieter aspect, but underlying strength is still a dominating factor in each district. Instead of being depressive, the Detroit labor troubles have had, if anything, a stimulating effect on scrap prices in other territories. For the stopping of assembly lines has cut off the heavy scrap offerings of these plants.

Of considerable significance is the fact that foreign users of steelmaking scrap are so anxious for supplies that they are coming into the market and meeting the very high domestic prices now prevailing here. Both England and Japan have been very actively soliciting tonnages at price levels in the neighborhood of $18 f.o.b., and several brokers have contracted for shipments over the next several months. For the first time in many months, export accumulations are being built up at Philadelphia, there has been a surge in export activity at Boston and prices for barge loadings at New York have advanced to new high levels.

Pittsburgh

Quiet for some time, the scrap market has shown a perceptibly strong tone in the past week. Two substantial tonnages of No. 1 steel have been sold into consumption for approximately $20 a ton, delivered. Where previously some observers had thought the automobile situation would immediately affect the local scrap market, it now develops that with supplies cut off from Detroit and the local operating rate maintaining its high level, no letup in demand by consumers is in prospect for the immediate future. Meanwhile, closing of the railroad lists for a reported price of about $19.50, delivered, for heavy railroad melting steel supports the recent strength in ordinary heavy melting.

Chicago

Price tendencies are slightly mixed, though on the whole there are more indicators of strength than of weakness. railroads and dealers have shaved their asking prices for the heavy tonnage grades, but mills remain consistent buyers at price levels established several weeks ago. On the other hand, specialty quotations are tending to move higher in a market in which all offerings are quickly absorbed and in which new supplies can be seen only a short distance ahead. Some hold-up orders are in from automobile foundries, while railroad car shops are reaching for more scrap as their melts increase.

Cleveland

The market is very firm with no evidence of its being affected by the automobile strike. There are no reports of hold-up of shipments by steel plants. Blast furnace grades have been marked up 50c. a ton, reflecting a purchase a few days ago of a small tonnage by a Cleveland consumer at higher than $13. Steel making grades are inactive. Brokers are paying $18.50 to $18.75 for No. 1 heavy melting steel for Youngstown district delivery and $17.75 to $18 for No. 2.

Philadelphia

After many months of inactivity, Port Richmond is again being used as a base for scrap exports. Insistent foreign demands have forced buying prices so high that dealers here can now afford to divert material from nearby domestic mills to Europe and the Far East. Foreign interests, it is said, are willing to pay almost any price for anything they can secure. The details of the orders for which scrap is now being loaded on boats are uncertain, but local brokers are offering $16.50 for No. 1 steel delivered alongside boats at Port Richmond. There is no definite way of determining the duration of this movement, but it is certain that it will continue as long as the price remains well above domestic offers and the need remains. District users apparently are still unwilling to pay what is being asked currently for No. 1 steel here, although Bethlehem is paying $16 to $16.50 in North Jersey for delivery to Bethlehem. Heavy melting steel is priced at $17 this week, and other items throughout the list have been marked up on the basis of mill sales in the past week.

Buffalo

A Buffalo mill bought 5000 tons of No. 2 steel and related grades at $16.90, thus establishing a new high price level. This follows the recent purchase by another mill of a sizable tonnage of No. 1 for $18. The market is very strong and at least one instance is noted of a dealer paying $16.50 for No. 2 steel. A sizable sale of borings and turnings at above $12 has been reported. The cast market is very strong, tonnages are scarce, and price reports are in the neighborhood of $17.

Boston

Exporters are active again and have boosted their bids for No. 1 and 2 steel about $2 a ton, thereby setting a new 1936-37 high record. In addition, a Weirton mill has reentered the market for steel turnings and busheling at higher prices, and a Pittsburgh district mill is sounding out the market for other material. A Boston district consumer has paid as high as $14.50 a ton delivered for breakable cast and $11.50 for cleaned and around $10 for uncleaned engine blocks, while western Massachusetts foundries are paying as high as $16 a ton delivered for No. 1 machinery cast, and $15 for textile cast.

New York

Demand is active, and prices continue to rise. In addition to the strong domestic situation, export business has developed to a point where New York brokers are paying as much for dock delivery as for loading on cars. No. 1 steel accordingly is priced at from $13 to $13.50 in both instances, and No. 2 is quotable at $1 beneath this figure. Certain cast grades are also higher.

Detroit

Prices are unchanged, and the market has quieted considerably after drastic rises in the last six weeks. The principal consumer is still out of market, although shipments have been received right along. Ford made a few offerings last week and prices obtained were somewhat above the market, in line with Ford's usual premium. General Motors is delivering no scrap, and no carryover into subsequent months has been written into January contracts. Chrysler has taken the same attitude, leaving brokers in an uncertain position as they are likely to sell themselves into a short situation.

St. Louis

The first full week of the new year found this market strong, with higher prices generally prevailing. The strength of the market is due to the fact that several consumers are negotiating for large tonnages.

Cincinnati

Dealers in old materials hold firmly to bullish tendencies despite the failure of anticipated first quarter demand to appear. Published quotations are unchanged, although dealers continue to bid strongly for available material.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$19.50 to $20.00
No. 2 hvy. mltng. steel.	17.75 to 18.25
No. 2 RR. wrought	19.50 to 20.00
Scrap rails	20.00 to 20.50
Rails, 3 ft. and under..	22.50 to 23.00
Comp. sheet steel	19.50 to 20.00
Hand. bundled sheets.	18.50 to 19.00
Hvy. steel axle turn...	18.00 to 18.50
Machine shop turn.....	14.00 to 14.50
Short shov. turn.	14.00 to 14.50
Mixed bor. & turn.....	13.50 to 14.00
Cast iron borings	14.00 to 14.50
Cast iron carwheels...	18.00 to 18.50
Hvy. breakable cast....	15.00 to 15.50
No. 1 cast	17.00 to 17.50
RR. knuckles & cplrs..	23.50 to 24.00
Rail coil & leaf springs.	23.50 to 24.00
Rolled steel wheels....	23.50 to 24.00
Low phos. billet crops.	24.00 to 24.50
Low phos. sh. bar....	23.50 to 24.00
Low phos. punchings..	23.00 to 23.50
Low phos. plate scrap.	23.00 to 23.50
Steel car axles	22.50 to 23.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.50 to $18.00
No. 2 hvy. mltng. steel.	16.50 to 17.00
Comp. sheet steel	17.25 to 17.75
Light bund. stampings	13.50 to 14.50
Drop forge flashings..	17.00 to 17.50
Machine shop turn.....	12.00 to 12.50
Short shov. turn.	12.00 to 12.50
No. 1 busheling	16.50 to 17.00
Steel axle turnings	15.00 to 15.50
Low phos. billet crops	22.00 to 22.50
Cast iron borings	12.50 to 13.00
Mixed bor. & turn....	12.50 to 13.00
No. 2 busheling	12.50 to 13.00
No. 1 cast	18.00 to 18.50
Railroad grate bars...	12.00 to 12.50
Stove plate	10.00 to 10.50
Rails under 3 ft.	22.00 to 22.50
Rails for rolling	20.00 to 20.50
Railroad malleable ...	18.00 to 18.50
Cast iron carwheels....	18.50 to 19.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.00
No. 2 hvy. mltng. steel.	16.00
Hydraulic bund., new..	$16.00 to 16.50
Hydraulic bund., old..	14.25 to 14.75
Steel rails for rolling..	17.50 to 18.00
Cast iron carwheels..	18.50 to 19.00
Hvy. breakable cast ..	17.00 to 17.50
No. 1 cast	18.50 to 19.00
Stove plate (steel wks.)	14.00 to 14.50
Railroad malleable ...	17.00 to 18.00
Machine shop turn.....	11.00 to 11.50
No. 1 blast furnace....	10.50 to 11.00
Cast borings	10.50 to 11.00
Heavy axle turnings..	15.00 to 15.50
No. 1 low phos. hvy....	21.00 to 21.50
Couplers & knuckles ..	21.50 to 22.00
Rolled steel wheels ...	21.50 to 22.00
Steel axles	21.50 to 22.00
Shafting	22.00 to 22.50
No. 1 RR. wrought....	16.50 to 17.00
Spec. iron & Steel pipe	14.50 to 15.00
Bundled sheets	14.00 to 14.50
No. 1 forge fire.....	15.00 to 15.50
Cast borings (chem.).	10.50 to 13.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel.....	$17.50 to $18.00
Auto. hvy. mltng. steel.	16.50 to 17.00
Alloy free	15.75 to 16.25
Shoveling steel	17.50 to 18.00
Hydraul. comp. sheets.	16.75 to 17.25
Drop forge flashings..	14.50 to 15.00
No. 1 busheling	16.50 to 17.00
Rolled carwheels	20.00 to 20.50
Railroad tires, cut	20.00 to 20.50
Railroad leaf springs..	20.00 to 20.50
Axle turnings	16.50 to 17.00
Steel coup. & knuckles	19.00 to 19.50
Coil springs	22.00 to 22.50
Axle turn. (elec.)	17.25 to 17.75
Low phos. punchings..	21.75 to 22.25
Low phos. plates, 12 in. and under	21.75 to 22.25
Cast iron borings	9.50 to 10.00
Short shov. turnings..	11.00 to 11.50
Machine shop turn. ...	9.00 to 9.50
Rerolling rails	19.00 to 19.50
Steel rails under 3 ft...	19.50 to 20.00
Steel rails under 2 ft. ..	22.00 to 22.50
Angle bars, steel.....	20.00 to 20.50
Cast iron carwheels ..	18.00 to 18.50
Railroad malleable ...	20.00 to 20.50
Agric. malleable	15.50 to 16.00
	Per Net Ton
Iron car axles	20.50 to 21.00
Steel car axles	$20.50 to $21.00
No. 1 RR. wrought....	16.50 to 17.00
No. 2 RR. wrought....	15.75 to 16.25
No. 2 busheling, old..	6.75 to 7.25
Locomotive tires	17.00 to 17.50
Pipes and flues	11.00 to 11.50
No. 1 machinery cast..	16.00 to 16.50
Clean auto. cast	14.75 to 15.25
No. 1 railroad cast ..	15.00 to 15.50
No. 1 agric. cast	12.50 to 13.00
Stove plate	10.00 to 10.50
Grate bars	11.50 to 12.00
Brake shoes	12.00 to 12.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$17.50 to $18.00
No. 2 hvy. mltng. steel.	16.50 to 17.00
Scrap rails	17.50 to 18.00
New hy. b'ndled sheets	16.50 to 17.00
Old hydraul. bundles ..	13.50 to 14.00
Drop forge flashings ..	16.50 to 17.00
No. 1 busheling	16.50 to 17.00
Hvy. axle turnings....	11.00 to 11.50
Machine shop turn....	11.50 to 12.00
Knuckles & couplers..	20.50 to 21.00
Coil & leaf springs....	20.50 to 21.00
Rolled steel wheels....	20.50 to 21.00
Low phos. billet crops.	20.50 to 21.00
Shov. turnings	12.25 to 12.75
Mixed bor. & turn.....	11.75 to 12.25
Cast iron borings	11.75 to 12.25
Steel car axles	20.50 to 21.00
No. 1 machinery cast..	16.50 to 17.00
No. 1 cupola cast	15.75 to 16.25
Stove plate	13.00 to 13.50
Steel rails under 3 ft...	20.00 to 20.50
Cast iron carwheels...	16.00 to 16.50
Railroad malleable	18.50 to 19.00
Chemical borings	13.00 to 13.50

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel.....	$12.50 to $13.00
Scrap steel rails	12.50 to 13.00
Short shov. turnings..	.... 8.00
Stove plate	.... 8.50
Steel axles	.... 15.00
Iron axles	.... 15.00
No. 1 RR. wrought....	.... 10.00
Rails for rolling	.... 14.00
No. 1 cast	.... 13.50
Tramcar wheels	.... 13.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:

Selected hvy. steel....	$16.50 to $17.00
No. 1 hvy. melting....	15.50 to 16.00
No. 2 hvy. melting....	14.50 to 15.00
No. 1 locomotive tires..	15.50 to 16.00
Misc. stand.-sec. rails.	16.75 to 17.25
Railroad springs	18.25 to 18.75
Bundled sheets	10.50 to 11.00
No. 2 RR. wrought ...	15.50 to 16.00
No. 1 busheling	8.50 to 9.00
Cast bor. & turn.....	5.50 to 6.00
Rails for rolling	17.50 to 18.00
Machine shop turn....	6.00 to 6.50
Heavy turnings	10.50 to 11.00
Steel car axles	20.00 to 20.50
Iron car axles	21.00 to 21.50
No. 1 RR. wrought	13.50 to 14.00
Steel rails under 3 ft..	17.50 to 18.00
Steel angle bars	16.25 to 16.75
Cast iron carwheels...	15.25 to 15.75
No. 1 machinery cast.	13.00 to 13.50
Railroad malleable	15.50 to 16.00
No. 1 railroad cast....	13.25 to 13.75
Stove plate	11.25 to 11.75
Agricul. malleable	12.50 to 13.00
Grate bars	11.00 to 11.50
Brake shoes	13.00 to 13.50

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$15.00 to $16.00
No. 2 hvy. mltng. steel.	12.75 to 13.25
Scrap rails for mltng..	15.50 to 16.00
Loose sheet clippings.	9.50 to 10.00
Bundled sheets	11.50 to 12.00
Cast iron borings	7.50 to 8.00
Machine shop turns ..	8.50 to 9.00
No. 1 busheling.....	12.00 to 12.50
No. 2 busheling.....	7.50 to 8.00
Rails for rolling	16.00 to 16.50
No. 1 locomotive tires..	13.75 to 14.25
Short tails	18.75 to 19.25
Cast iron carwheels ..	14.75 to 15.25
No. 1 machinery cast..	15.75 to 16.25
No. 1 railroad cast	14.75 to 15.25
Burnt cast	10.75 to 11.25
Stove plate	10.75 to 11.25
Agricult. malleable ...	14.75 to 15.25
Railroad malleable	16.25 to 16.75

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$14.50 to $15.00
No. 2 hvy. mltng. steel.	13.75 to 14.25
Borings and turnings.	10.50 to 11.00
Long turnings	10.00 to 10.50
Short shov. turnings..	11.25 to 11.75
No. 1 machinery cast..	15.00 to 15.50
Automotive cast	15.00 to 15.50
Hydraul. comp. sheets.	15.50 to 16.00
Stove plate	9.25 to 9.75
New factory bushel...	14.75 to 15.25
Old No. 2 busheling ..	9.00 to 9.50
Sheet clippings	11.75 to 12.25
Flashings	14.00 to 14.50
Low phos. plate scrap.	16.25 to 16.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$18.50 to $19.00
Hydraulic bundles	18.25 to 18.75
Machine shop turn....	14.00 to 14.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$13.00 to $13.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Hvy. breakable cast...	13.00 to 13.50
No. 1 machinery cast..	13.50 to 14.00
No. 2 cast	11.00 to 11.50
Stove plate	10.50 to 11.00
Steel car axles	18.00 to 19.00
Shafting	17.00 to 18.00
No. 1 RR. wrought ...	12.00 to 12.50
No. 1 wrought long....	11.00 to 11.50
Spec. iron & steel pipe	11.50 to 12.00
Forge fire	9.50 to 10.00
Rails for rolling	13.50 to 14.00
Short shov. turnings...	7.50 to 8.25
Machine shop turn.	8.25 to 8.50
Cast borings	8.25 to 8.50
No. 1 blast furnace	6.00 to 6.50
Cast borings (chem.)..	10.00 to 11.00
Unprepar. yard scrap.	7.00 to 7.50

Per gross ton, delivered local foundries:

No. 1 machn. cast.....	$16.00 to $16.50
No. 1 hvy. cast cupola.	12.50 to 13.00
No. 2 cast	11.50 to 12.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$12.80 to $13.30
Scrap rails	12.80 to 13.30
No. 2 steel	11.30 to 11.55
Breakable cast	12.60 to 13.10
Machine shop turn.....	7.55 to 8.30
Unmixed bor. & turn..	.... 8.30
Bund. skeleton long....	11.55 to 11.80
Shafting	16.75 to 17.00
Cast bor. chemical.....	7.00 to 8.75

Per gross ton delivered consumers' yards:

Textile cast	$14.00 to $15.00
No. 1 machine cast ..	15.00 to 16.00
Stove plate	10.50 to 11.00

EXPORT

Dealers' buying prices per gross ton:

New York, delivered alongside barges

No. 1 hvy. mltng. steel.	$13.50
No. 2 hvy. mltng. steel.	12.50
No. 2 cast	11.00
Stove plate	10.00
Rails (scrap)	13.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	$14.25 to $14.50
No. 2 hvy. mltng. steel.	13.25 to 13.50
Rails (scrap)	14.50 to 14.75
Stove plate	7.75 to 8.00

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel.	$16.50

New Orleans, on cars at Stuyvesant Dock

No. 1 hvy. mltng. steel.	$13.60 to $13.75
No. 2 hvy. mltng. steel.	12.60 to 12.75

Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	$10.50 to $11.00
Compressed bundles ..	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$34.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.80c.

Wire Rods
(No. 5 to 15/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$43.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	44.00
F.o.b. Worcester, Mass.	45.00
F.o.b. Birmingham	46.00
F.o.b. San Francisco	52.00
F.o.b. Galveston	49.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.20c.
F.o.b. Chicago or Gary	2.25c.
F.o.b. Duluth	2.35c.
Del'd Detroit	2.35c.
F.o.b. Cleveland	2.25c.
F.o.b. Buffalo	2.30c.
Del'd Philadelphia	2.51c.
Del'd New York	2.55c.
F.o.b. Birmingham	2.35c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars Pacific ports	2.75c.

Rail Steel
(For merchant trade)

F.o.b. Pittsburgh	2.05c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	2.10c.
F.o.b. Buffalo	2.15c.
F.o.b. Birmingham	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.60c.

Billet Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.25c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.30c.
Del'd Detroit	2.40c.
F.o.b. cars dock Gulf ports	2.65c.
F.o.b. cars dock Pacific ports	2.65c.

Rail Steel Reinforcing
(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.10c.
F.o.b. Buffalo, Cleveland Youngstown, Chicago, Gary or Birmingham	2.15c.
F.o.b. cars dock Gulf ports	2.50c.
F.o.b. cars dock Pacific ports	2.50c.

Iron

F.o.b. Chicago	2.15c.
F.o.b. Pittsburgh (refined)	3.25c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.55c.
F.o.b. Cleveland, Chicago and Gary	2.60c.
F.o.b. Buffalo	2.65c.
Del'd Detroit	2.70c.
Del'd eastern Michigan	2.75c.

* In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago or Gary	2.10c.
Del'd Cleveland	2.235c.
F.o.b. Coatesville or Spar. Pt.	2.15c.
Del'd Philadelphia	2.235c.
Del'd New York	2.33c.
F.o.b. Birmingham	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.60c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.60c.
F.o.b. Chicago	3.65c.
F.o.b. Coatesville	3.70c.
F.o.b. cars dock Gulf ports	4.00c.
F.o.b. cars dock Pacific ports	4.15c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago	2.10c.
Del'd Cleveland	2.235c.
F.o.b. Buffalo or Bethlehem	2.15c.
Del'd Philadelphia	2.255c.
Del'd New York	2.305c.
F.o.b. Birmingham (standard)	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.60c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.40c.
F.o.b. Chicago or Buffalo	2.50c.
F.o.b. cars dock Gulf or Pacific Coast ports	2.85c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb. per gross ton	$39.00
Angle bars, per 100 lb.	2.55c. to 2.70c.

F.o.b. Basing Points

Light rails (from billets) per gross ton	$38.00
Light rails (from rail steel) per gross ton	37.00

	Base per 100 Lb.
Spikes	2.90c.
Tie plates, steel	2.10c.
Tie plates, Pacific Coast ports	2.20c.
Track bolts, to steam railroads	4.00c.
Track bolts, to jobbers, all sizes (per 100 counts)	65-5-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	2.15c.
No. 10, f.o.b. Gary	2.25c.
No. 10, del'd Detroit	2.35c.
No. 10, del'd Philadelphia	2.46c.
No. 10, f.o.b. Birmingham	2.30c.
No. 10, f.o.b. cars dock Pacific ports	2.70c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.80c.
No. 24, f.o.b. Gary	2.90c.
No. 24, del'd Detroit	3.00c.
No. 24, del'd Philadelphia	3.11c.
No. 24, f.o.b. Birmingham	2.95c.
No. 24, f.o.b. cars dock Pacific ports	3.45c.
No. 24, wrought iron, Pittsburgh	4.50c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.80c.
No. 10 gage, f.o.b. Gary	2.90c.
No. 10 gage, f.o.b. Detroit	3.00c.
No. 10 gage, del'd Philadelphia	3.11c.
No. 10 gage, f.o.b. Birmingham	2.95c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.40c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.25c.
No. 20 gage, f.o.b. Gary	3.35c.
No. 20 gage, del'd Detroit	3.45c.
No. 20 gage, del'd Philadelphia	3.56c.
No. 20 gage, f.o.b. Birmingham	3.40c.
No. 20 f.o.b. cars dock Pacific ports	3.80c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.40c.
No. 24, f.o.b. Gary	3.50c.
No. 24, del'd Philadelphia	3.71c.
No. 24, f.o.b. Birmingham	3.55c.
No. 24, f.o.b. cars dock Pacific ports	4.00c.
No. 24, wrought iron, Pittsburgh	5.15c.

Electrical Sheets
(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Special Motor	5.10c.
Special Dynamo	5.80c.
Transformer	6.30c.
Transformer Special	7.30c.
Transformer Extra Special	7.80c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.70c.
F.o.b. Gary	3.80c.
F.o.b. cars dock Pacific ports	4.40c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.20c.
No. 20, f.o.b. Gary	3.30c.
No. 20, f.o.b. Birmingham	3.80c.
No. 20, f.o.b. cars dock Pacific ports	3.80c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.95c.
No. 28, Gary	3.05c.
No. 28, cars dock Pacific ports	3.55c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$4.85
Standard cokes, f.o.b. Gary	4.95

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes
Manufacturing Ternes

	Per Base Box
F.o.b. Pittsburgh	*$4.15
F.o.b. Gary	* 4.25

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate
(F.o.b. Pittsburgh)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., Pittsburgh	2.15c.
All widths up to 24 in., Chicago	2.25c.
All widths up to 24 in., del'd Detroit	2.35c.
All widths up to 24 in., Birmingham	2.30c.
Cooperage stock, Pittsburgh	2.25c.
Cooperage stock, Chicago	2.35c.

Cold-Rolled Strip*

	Base per Lb.
F.o.b. Pittsburgh	2.85c.
F.o.b. Cleveland	2.85c.
Del'd Chicago	3.13c.
F.o.b. Worcester	3.05c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	2.85c.	3.05c.
Carbon	.51- .75	3.95c.	4.15c.
Carbon	.76-1.00	5.70c.	5.90c.
Carbon	Over 1.00	7.75c.	7.95c.

Fender Stock

No. 14, Pittsb'gh or Cleveland	3.10c.
No. 14, Worcester	3.50c.
No. 20, Pittsb'gh or Cleveland	3.50c.
No. 20, Worcester	3.90c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Spring wire	3.20c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.25
Smooth coated nails	2.25

	Base per 100 Lb.
Annealed fence wire	$2.90
Galvanized fence wire	3.30
Polished staples	2.95
Galvanized staples	3.20
Barbed wire, galvanized	2.75
Twisted barbless wire	2.75
Woven wire fence, base column	63.00
Single loop bale ties, base column	55.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	57	37	¼ & ⅜	.+6	+26
¼ to ⅜	.60	44½	½	27	10½
½	.....64½	55	¾	32	16
¾	.....67½	59	1 & 1¼	.35	21
1 to 3	...69½	61½	1½	39	23½
			2	.....38½	23

Lap Weld

2	62	53½	2	.....32½	18
2½ to 3	.65	56½	2½ to 3½	33½	20½
3½ to 6	.67	58½	4 to 8	..35½	24
7 & 8	.66	56½	9 to 12	..28½	15
9 & 10	.65½	56			
11 & 12	.64½	55			

Butt Weld, extra strong, plain ends

⅛	.....55½	42½	¼ & ⅜	.+7	+39
¼ to ⅜	.57½	46½	½	28	13
½	.....62½	54½	¾	33	18
¾	.....66½	58½	1 to 2	..39	24½
1 to 3	...68	61			

Lap Weld, extra strong, plain ends

2	60	52½	2	.....35½	21½
2½ to 3	.64	56½	2½ to 4	.41	28½
3½ to 6	.67½	60	4½ to 6	.40½	28
7 & 8	..66½	57	7 & 8	..41½	28½
9 & 10	..65½	56	9 to 12	..32	20½
11 & 12	..64½	55			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	17.61	16.01
2¾ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	$21.45	$19.50
4½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	37.09	34.62
4 in. od.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5 %
12,000 lb. or ft. to 24,999 lb. or ft.	12½ %
6,000 lb. or ft. to 11,999 lb. or ft.	25 %
2,000 lb. or ft. to 5,999 lb. or ft.	35 %
Under 2,000 lb. or ft.	50 %

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$50.00
6-in. and larger, del'd New York	48.00
*6-in. and larger, Birmingham	42.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	50.50
F.o.b. dock, Seattle	50.50
4-in., f.o.b. dock, San Francisco or Los Angeles	53.50
F.o.b. dock, Seattle	53.50

Class "A" and gas pipe, $3 extra.
4-in. pipe is $3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $41, Birmingham, and $49.50, delivered Chicago; and 4-in. pipe, $44, Birmingham, and $52.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller	70
Larger than ½ in.	65 and 10
Lag bolts	65 and 10
Plow bolts, Nos. 1, 2, 3, and 7 heads	65, 10 and 10
Hot-pressed nuts, blank or tapped, square	65 and 10
Hot-pressed nuts, blank or tapped, hexagon	65 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	65 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 5
Stove bolts in packages, nuts attached	72½
Stove bolts in packages, with nuts separate	72½ and 5
Stove bolts in bulk	81½

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.25
F.o.b. Chicago or Birmingham	3.35

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $55 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.75c.
Delivered, Detroit	2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1½% Nickel)	$0.25
2100 (2½% Nickel)	0.95
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric turned steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.25c. base per lb. Delivered Detroit, 3.40c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

	Base per Lb.
High speed	60c.
High carbon chrome	39c.
Oil hardening	22c.
Special	20c.
Extra	16½c.
Regular	13c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£9
Billets, open-hearth	£6 to £6 5s.
Tin plate, per base box	18s. 9d. to 19s. 1½d.
Steel bars, open-hearth	£7 17½s.
Beams, open-hearth	£7 12½s.
Channels, open-hearth	£7 17½s.
Angles, open-hearth	£7 12½s.
Black sheets, No. 24 gage	£10 15s.
Galvanized sheets, No. 24 gage	£13 5s.

CONTINENTAL

Per Metric Ton, Gold £, f.o.b. Continental Ports

Current dollar equivalent is ascertained by multiplying gold pound prices by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.

Billets, Thomas	£2 17s.
Wire rods, No. 5 B.W.G.	£4 10s.
Steel bars, merchant	£3 15s. 6d.
Sheet bars	£2 15s. 6d.
Plate, ¼ in. and up	£4 14s.
Plate, 3/16 in. and 5 mm.	£4 12s. 6d.
Sheet, ⅛ in.	£4 17s. 6d.
Beams, Thomas	£3 2s. 6d.
Ang'es (Basic)	£3 2s. 6d.
Hoops and strip, base	£4
Wire, plain, No. 8	£5 7s. 6d.
Wire nails	£5 15s.
Wire, barbed, 4 pt. No. 10 B.W.G.	£8 15s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.40c.
Structural shapes	3.40c.
Soft steel bars and small shapes	3.30c.
Reinforcing steel bars	3.30c.
Cold-finished and screw stock:	
Rounds and hexagons	3.80c.
Squares and flats	3.80c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.50c.
Hoops	4.00c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.65c.
Galv. sheets (No. 24), 25 or more bundles	4.25c.
Hot-rolled sheets (No. 10)	3.25c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.94
Spikes, large	3.25c.

	Per Cent Off List
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	$3.75
Wire, black, soft ann'l'd, base per 100 lb.	3.15c.
Wire, galv. soft, base per 100 lb.	3.55c.
Common wire nails, per keg	2.50c.
Cement coated nails, per keg	2.50c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.45c.
Soft steel bars, rounds	3.35c.
Soft steel bars, squares and hexagons	3.50c.
Cold-fin. steel bars:	
Rounds and hexagons	3.95c.
Flats and squares	3.95c.
Hot-rolled strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	4.00c.
Track bolts (keg lots)	5.10c.
Rivets, structural (keg lots)	4.10c.
Rivets, boiler (keg lots)	4.10c.

	Per Cent Off List
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	60
Cut point set screws	75 and 10
Flat head bright wood screws	62 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb.	$4.05
Com. wire nails, 15 kegs or more	2.70c.
Cement c't'd nails, 15 kegs or more	2.70c.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants wihtin the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.65c.
Structural shapes	3.62c.
Soft steel bars, rounds	3.62c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.22c.
Flats and squares	4.22c.
Cold-rolled: strip, soft and quarter hard	3.57c.
Hoops	3.82c.
Bands	3.82c.
Hot-rolled sheets (No. 10)	3.57c.
Hot-rolled ann'l'd sheets (No. 24*)	4.22c.
Galvanized sheets (No. 24*)	4.82c.
Long terne sheets (No. 24)	5.55c.
Armco iron, galv. (No. 24†)	5.85c.
Toncan iron, galv. (No. 24†)	5.85c.
Galvannealed (No. 24†)	5.95c.
Armco iron, hot-rolled annealed (No. 24†)	5.30c.
Toncan iron, hot-rolled annealed (No. 24†)	5.30c.
Armco iron hot-rolled (No. 10†)	4.35c.
Toncan iron, hot-rolled (No. 10†)	4.35c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.85c.
Deep drawing	5.50c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.32c.
SAE, 3100, hot-rolled	5.72c.
SAE, 6100 hot-rolled, annealed	9.92c.
SAE, 2300, cold-rolled	8.30c.
SAE, 3100, cold-rolled, annealed	7.75c.
Floor plate, ⅛ in. and heavier	5.45c.
Standard tool steel	11.75c.
Wire, black, annealed (No. 9)	3.60c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x ½ in. and larger	4.11c.
Open-hearth spring steel	4.15c. to 10.15c.
Common wire nails, base per keg	$3.70

	Per Cent Off List
Machine bolts, square head and nut:	
All diameters	65
Carriage bolts, cut thread:	
All diameters	65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.
†125 lb. and more.

ST. LOUIS

	Base per Lb
Plates and struc. shapes	3.69c.
Bars, soft steel (rounds and flats)	3.59c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.74c.
Cold-fin. rounds, shafting, screw stock	4.19c.
Hot-rolled annealed sheets (No. 24)	4.29c.
Galv. sheets (No. 24)	4.89c.
Hot-rolled sheets (No. 10)	3.59c.
Black corrug. sheets (No. 24)	4.29c.
½ Galv. corrug. sheets	4.89c.
Structural rivets	4.44c.
Boiler rivets	4.44c.

	Per Cent Off List
Tank rivets, 7/16 in. and smaller.	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.30c.
*Structural shapes	3.30c.
*Soft steel bars, small shapes, iron bars (except bands)	3.45c.
‡Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.18c.
*Steel hoops	3.80c.
*Steel bands, No. 12 and 3/16 in. incl.	3.55c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	4.15c.
†Galvanized sheets (No. 24)	4.80c.
*Hot-rolled annealed sheets (No. 10)	3.40c.
Diam. pat. floor plates, ¼ in.	5.25c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.56c.
Soft steel bars	3.25c.
‡Reinforc. steel bars	2.25c.
†Cold-finished steel bars	3.95c.
Flat-rolled steel under ¼ in.	3.66c.
Cold-finished strip	†3.25c.
Hot-rolled annealed sheets (No. 24)	4.31c.
Galvanized sheets (No. 24)	4.91c.
Hot-rolled sheets (No. 10)	3.41c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.66c.
*Black ann'l'd wire, per 100 lb.	$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg	2.45c.

	Per Cent Off List
Machine and carriage bolts, small	70
Large	65 and 10
Nuts, 100 count	65

†Outside delivery 10c. less.
*For 5000 lb. or less.
‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb
Plates and struc. shapes	3.65c.
Floor plates	5.40c.
Bars, rounds, flats and angles	3.55c.
Other shapes	3.70c.
Rail steel reinforc. bars	3.40c.
Hoops and bands, 3/16 in. and lighter	3.75c.
Cold-finished bars	4.15c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.05c.
Galv. sheets (No. 24) 3750 lb. or more	4.07c.
Galvanized sheets (No. 24) over 3500 lb.	4.65c.
Hot-rolled sheets (No. 10)	3.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload	3.04
Cement c't'd nails, base 100-lb keg	3.50
Chain, lin. per 100 lb	8.35

	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.62c.
Struc. shapes	3.50c.
Soft steel bars	3.40c.
Reinforcing bars	2.75c.
Cold-fin. flats and sq.	4.00c.
Rounds and hex.	4.00c.
Cold-rolled strip steel	3.44c.
Hot-rolled annealed sheets (No. 24)	4.46c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.72c.
Galv. sheet (No. 24)	5.00c.
Bands	3.72c.
Hoops	3.72c.
Heavy top-rolled sheets	3.47c.
Com. wire nails, base per keg	$3.00
Black wire, base per 100 lb. (2500-lb. lots or under)	4.10c.
(Over 2500 lb.)	4.00c.

BOSTON

	Base per Lb
Channels, angles	3.75c.
Tees and zees, under 3"	4.00c.
H beams and shapes	3.77c.
Plates — Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.78c.
Floor plates, diamond pattern	5.58c.
Bar and bar shapes (mild steel)	3.75c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.90c. to 4.90c.
Half rounds, half ovals, ovals and bevels	5.00c.
Tire steel	5.00c.
Cold-rolled strip steel	3.495c.
Cold-finished rounds, squares and hexagons	4.30c.
Cold-finished flats	4.30c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	4.55c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.44c.
Structural shapes	3.65c.
Plates	3.65c.
Floor plates	5.40c.
Hot-rolled annealed sheets (No. 24)*	4.34c.
Hot-rolled sheets (No. 10)	3.44c.
Galvanized sheets (No. 24)**	5.00c.
Bands and hoops	3.69c.
†Cold-finished bars	4.04c.
Cold-rolled strip	3.43c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.79c.

Bolts and nuts, in cases, 65 per cent off list

Broken cases .....60 per cent off

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

* Under 400 lb., .50c. over base; 400 to 3499 lb., base; 3500 lb. and over, base less .25c.

** Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3749 lb., base less .20c.; 3750 to 7499 lb., less .40c.; 7500 lb. and over, less .60c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Common wire nails, base per keg $2.75

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.56c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.46c.
Soft steel bars, squares and hexagons	3.61c.
Hot-rolled strip	3.71c.
Hot-rolled annealed sheets (No. 24)	**4.16c.**
Galvanized sheets (No. 24)	4.76c.
Cold-finished steel bars	4.06c.
Structural rivets (keg lots)	4.21c.
Boiler rivets, cone head (keg lots)	4.21c.
Track spikes (keg lots)	4.11c.
Track bolts (keg lots)	5.21c.
Black annealed wire (No. 14 and heavier)	4.16c.
Com. wire nails and cement coated nails 15 kegs and over	2.81c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller	65
Larger	65
Coach and lag screws	65
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	65

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.60c.
Structural shapes	3.70c.
Plates	3.70c.
Cold-finished bars	4.42c.
Hot-rolled annealed sheets, No. 24	**4.30c.**
Galvanized sheets, No. 24	**4.90c.**

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	3.50c.
Structural shapes	3.60c.
Reinforcing bars	....prices on application
Plates	3.60c.
Hot-rolled sheets, No. 10	3.45c.
Bands	3.50c.
Hoops	3.75c.
Special threading steel	3.60c.
Diamond pattern floor plates ¼ in. and heavier	5.60c.
Galvanized bars, bands and small shapes	6.00c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	4.15c.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.71c.
Iron bars	3.71c.
Reinforcing bars	3.71c.
Structural shapes	3.81c.
Plates	3.81c.
Hot-rolled sheets No. 10	3.66c.
Hot-rolled annealed sheets, No. 24*	3.56c.
Galvanized sheets No. 24*	4.16c.
Steel bands	3.91c.
Cold-finished bars	4.51c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	3.82c.
Shapes, bar size	3.82c.
Iron bars	3.82c.
Structural shapes	3.92c.
Plates	3.92c.
Hot-rolled sheets, No. 10	3.77c.
Hot-rolled annealed sheets, No. 24	4.67c.
Galvanized sheets, No. 24	5.27c.
Steel bands	4.02c.
Cold-drawn rounds	4.49c.
Cold-drawn flats, squares, hexagons	6.49c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.70c.
Reinforcing bars	3.50c.
Structural shapes	3.80c.
Plates	3.80c.
Hot-rolled sheets, No. 10	3.85c.
Hot-rolled annealed sheets, No. 24	4.55c.
Galvanized sheets, No. 24	4.95c.
Steel bands	4.25c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	$2.80
Bolts and nuts, per cent off list	70-10

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.75c.	4.00c.	3.85c.
Shapes, standard	3.75c.	4.00c.	3.85c.
Soft steel bars	3.85c.	4.00c.	4.10c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.725c.	2.725c.	2.725c.
Hot-rolled annealed sheets (No. 24)	4.65c.	4.60c.	4.85c.
Hot-rolled sheets (No. 10)	3.95c.	4.15c.	4.10c.
Galv. sheets (No. 24 and lighter)	5.25c.	5.05c.	5.35c.
Galv. sheets (No. 22 and heavier)	5.50c.	5.20c.	5.35c.
Cold finished steel			
Rounds	6.30c.	6.35c.	6.60c.
Squares and hexagons	7.55c.	7.60c.	6.60c.
Flats	8.05c.	8.10c.	7.60c.
Common wire nails—base per keg less carload	$3.10	$3.05	$3.10

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$48.00
High-heat duty, New Jersey	58.00
High-heat duty, Ohio	43.00
Intermediate, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	43.00
Intermediate, New Jersey	46.00
No. 1, Ohio	40.00
Ground fire clay, per ton	**7.00**

5 per cent trade discount on fire clay brick.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$48.00
Chicago District	57.00
Birmingham	48.00
Silica cement per net ton	8.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$47.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	$67.00
Chemically bonded, f.o.b. Baltimore	57.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	42.00
Domestic, f.o.b. Chewelah, Wash.	24.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$22.75
F.o.b. Bethlehem, Birdsboro, and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.27
Delivered Newark or Jersey City	23.39
Delivered Philadelphia	22.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	21.00
F.o.b. Jackson, Ohio	22.75
Delivered Cincinnati	21.07
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	18.50
Delivered San Francisco, Los Angeles or Seattle	23.00
F.o.b. Birmingham*	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	20.50
Delivered Cincinnati	21.01
Delivered Canton, Ohio	21.76
Delivered Mansfield, Ohio	22.26
F.o.b. Jackson, Ohio	22.25
F.o.b. Provo, Utah	18.00
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Everett, Mass.	$23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Boston Switching District	24.50
Delivered Newark or Jersey City	24.39
Delivered Philadelphia	23.76
F.o.b. Buffalo and Erie, Pa., and Duluth	22.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	21.50
F.o.b. Birmingham	22.50
Delivered Cincinnati	22.51
Delivered Canton, Ohio	22.76
Delivered Mansfield, Ohio	23.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$25.50

Grav Forge

Valley or Pittsburgh furnace	$20.50

Charcoal

Lake Superior furnace	$23.50
Delivered Chicago	26.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$80.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%	$24.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$29.50
10.51 to 11.00%	30.00
11.00 to 11.50%	30.50
11.51 to 12.00%	31.00
12.01 to 12.50%	31.50
12.51 to 13.00%	32.00
13.01 to 13.50%	32.50
13.51 to 14.00%	33.00
14.01 to 14.50%	33.50
14.51 to 15.00%	34.00
15.01 to 15.50%	34.50
15.51 to 16.00%	35.00
16.01 to 16.50%	35.50
16.51 to 17.00%	36.00

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$38.00
Ton lots or less, per ton	43.00
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are $5 a ton higher except on 75 per cent ferrosilicon on which premium is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65
Mesabi, non-Bessemer, 51.50%	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria	13.00c. to 13.50c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	10.00c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	27c. to 30c.
Man., African, Indian, 44-48%	25c to 30c.
Man., African, Indian, 49-51%	27c. to 30c.
Man., Brazilian, 46 to 48½%	Nominal..25c. to 30c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	$15.25 to $15.50
Tungsten, domestic, scheelite delivered, nominal	15.00

Per Gross Ton

Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$18.00 to 19.00
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	20.00 to 21.00
Chrome concentrate, 50% and over Cr_2O_3 c.i.f. Atlantic ports	22.00
52% Cr_2O_3 (Turkish)	23.00 to 24.00
48 to 49% Cr_2O_3 (Turkish)	20.00 to 21.00

FLUORSPAR *Per Net Ton*

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00 to $19.00
Domestic, barge and rail	18.50 to 19.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	20.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	23.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL *Per Gal.*

F.o.b. Bayonne or Baltimore No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	4.25c.
Del'd Ch'go, No. 5 industrial	3.90c.
Del'd Cleve'd, No. 3 distillate	6.00c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke	*Per Net Ton*
Furnace, f.o.b. Connellsville, Prompt	$4.00 to $4.25
Foundry, f.o.b. Connellsville, Prompt	4.50 to 5.75
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	12.00
Foundry, by-product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by-product, Philadelphia	9.85
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.75
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.76

Coal	*Per Net Ton*
Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

FABRICATED STEEL

NORTH ATLANTIC STATES

Pepperhill, Mass., 266 tons, State bridge, to Bethlehem Steel Co.

New Bedford, Mass., 200 tons, Revere Copper & Brass Co. strip mill, to New England Structural Co., Everett, Mass.

Milton, Vt., 195 tons, tainter gate and structural steel for Clark Falls development, to S. Morgan Smith Co.

New York, 1330 tons, track covering, New York Central Railroad, 121st to 124th Streets, to American Bridge Co.

New York, 115 tons, National City Bank building, to Egleston Brothers & Co., Long Island City, N. Y.

New York, 1850 tons, New York Central viaduct, 34th to 37th Streets, to American Bridge Co.

New York, 145 tons, office building at 524 Madison Avenue, to Fassler Iron Works.

Queens, N. Y., 350 tons, asphalt plant number one for city of New York, to Lehigh Structural Steel Co., Allentown, Pa.

Maspeth, N. Y., 600 tons, warehouse for National Can Co., to Joseph T. Ryerson & Son, Inc.

Yonkers, N. Y., 330 tons, grade crossing elimination for New York Central, to Bethlehem Steel Co.

Saratoga, N. Y., 260 tons, betting ring and field stand for Saratoga race track, to Bethlehem Steel Co.

Buffalo, 400 tons, sewage disposal plant, to Bethlehem Steel Co.

Niagara Falls, N. Y., 100 tons, addition to Niacet Chemical Co., to Buffalo Structural Steel Co.

Niagara Falls, N. Y., 170 tons, addition to Union Carbide Co., to Bethlehem Steel Co.

Harrison, N. J., 260 tons, plate shop, Worthington Pump & Machinery Co., to Lehigh Structural Steel Co.

Linden, N. J., 115 tons, Standard Oil building, to Elizabeth Iron Works, Elizabeth, N. J.

Reading, Pa., 340 tons, Wilson Products Co. building, to Reading Steel Products Co.

Newark, Del., 685 tons, grandstand for race course, to Belmont Iron Works, Philadelphia.

Ambridge, Pa., 370 tons, addition to high school, to American Bridge Co.

Paoli, Pa., 490 tons, State bridge over route 142, to Bethlehem Steel Co.

Knickerbocker, Pa., 230 tons, State highway bridge, to Bethlehem Steel Co.

Philadelphia, 270 tons, enclosed loading platform, Atlantic Refining Co., to Belmont Iron Works.

Clinton County, Pa., 140 tons, highway bridge, to Belmont Iron Works.

Eddystone, Pa., 540 tons, two buildings for General Steel Castings Co., to Belmont Iron Works.

Clinton County, Pa., 250 tons, truss bridge, to Pittsburgh-Des Moines Steel Co.

Somerset-Cambria Counties, Pa., 175 tons, highway bridges, to American Bridge Co.

SOUTH AND SOUTHWEST

Clarksburg, W. Va., 1100 tons, building for National Carbon Co., to Bethlehem Steel Co.

Chattanooga, Tenn., 330 tons, bridge, to Virginia Bridge Co.

Port St. Joe, Fla., 2850 tons, pulp and paper mill, to Virginia Bridge Co.

Travis County, Tex., 1080 tons, bridge, to Vincennes Bridge Co., Vincennes, Ind.

Fannin County, Tex., and Bryan County, Okla., 1650 tons, interstate bridge over Red River, to Illinois Steel Bridge Co., Jackson, Ill.

Okmulgee, Okla., 110 tons, bridge, to Capitol Steel & Iron Co., Oklahoma City.

Morenci, Ariz., 500 tons, building for Phelps Dodge Corp., to Kansas City Structural Steel Co., Kansas City, Kan.

CENTRAL STATES

Jackson, Mich., 638 tons, warehouse for Goodyear Tire & Rubber Co., to Austin Co.

Detroit, 265 tons, superstructure for sewer, to American Bridge Co.

Columbus, Ohio, 200 tons, building for Timken Roller Bearing Co., to American Bridge Co.

Warren, Ohio, 120 tons, extension to crane runway for Republic Steel Corp., to Ohio Structural Steel Co.

Wickliffe, Ohio, 150 tons, addition for Cleveland Crane & Engineering Co., to Austin Co.

Bridgeport, Ohio, 265 tons, George Paper Co. building, to Riverside Steel Co.

Des Moines, Iowa, 730 tons, Iowa Packing Co. building, to Gage Structural Steel Co.

Clinton, Iowa, 3276 tons, dam No. 13, Mississippi River, to Worden-Allen Co., Milwaukee.

Elmhurst, Ill., 400 tons, highway bridge, to American Bridge Co.

Lucas County, Ohio, 145 tons, State highway bridge, to Bethlehem Steel Co.

Cincinnati, 450 tons, Laurel Homes project, to American Bridge Co.

Muskegon Heights, Mich., 450 tons, two buildings, Norge Corp., to Palmer-Bee Co.

Chicago, 460 tons, turntables for Milwaukee Road, to Bethlehem Steel Co.

Chicago, 500 tons, Standard Oil Co. of Indiana, to James J. Heggie & Son, Joliet, Ill.

Chicago, 780 tons, bridge over Chicago Junction Railroad, to Mississippi Valley Structural Steel Co. and Duffin Iron Co.

Chicago, 600 tons, addition to Wendell Phillips high school, to Eggers Iron Co., Chicago.

Lombard, Ill., 200 tons, bridge, to Worden-Allen Co.

Villa Park, Ill., 200 tons, bridge, to Worden-Allen Co.

Secor and Eureka, Ill., 220 tons, bridges for Peoria & Western Railroad, to Bethlehem Steel Co.

East St. Louis, Ill., 140 tons, building for Union Electric Light & Power Co., to St. Louis Structural Steel Co., East St. Louis, Ill.

Missouri-Pacific Railroad, 1020 tons, bridges; 670 tons, to Stupp Brothers Bridge & Iron Co., St. Louis; 350 tons, to Bethlehem Steel Co.

WESTERN STATES

Denver, 396 tons, three bridges, to unnamed bidders.

Polson, Mont., 125 tons, intake guides and screens, to Kansas City Structural Steel Co.

Yuba City, Cal., 500 tons, Feather River bridge, to Judson Pacific Co., San Francisco.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Worcester, Mass., 300 tons, garage and tunnel for parcel post building.

Ludlow-Wilbraham, Mass., 175 tons, State bridge.

Worcester, Mass., 150 tons, malt house.

Erving-Montague, Mass., 125 tons, State bridge.

Columbia-Windham, Conn., 130 tons, bridge.

New York, 500 tons, stadium extension, American League Baseball Club.

New York, 2500 tons, express highway viaduct No. 6, New York Central Railroad.

New York, 475 tons, public school number 108 in Bronx.

Queens, N. Y., 460 tons, public school No. 104.

Geneseo, N. Y., 300 tons, school buildings for the State of New York.

Allegheny County, Pa., 350 tons, grade crossing elimination.

Philadelphia, 2350 tons, boiler house extension, Philadelphia Electric Co.

State of Delaware, 700 tons, bridge over Chesapeake and Delaware Canal for Pennsylvania Railroad.

Baltimore, 4000 tons, Gunpowder Falls, Montebello tunnel.

THE SOUTH

Benwood, W. Va., 600 tons, warehouse building, Wheeling Steel Corp.

Columbia, Tenn., 1100 tons, mill buildings, National Carbon Co.

Memphis, Tenn., 960 tons, bridge for Missouri Pacific.

Plymouth, N. C., 700 tons, building.

Birmingham, Ala., 1400 tons, cranes for Tennessee Coal, Iron & Railroad Co.

Houston, Tex., 1250 tons, oil derricks.

Gondales, Tex., 650 tons, bridge.

New Orleans, 1200 tons, warehouse.

Simmesport, La., 1200 tons, bridge.

Missouri Pacific Railroad, 1000 tons, bridges.

CENTRAL STATES

Cleveland, 200 tons, two buildings for Steel & Tubes.

Jackson, Mich., 800 tons, bridge.

Springfield, Ill., 210 tons, Chicago & Illinois Midland railroad bridge.

Milwaukee, 2000 tons, addition to Schlitz brewery.

Chicago, 1000 tons, building.

Sioux City, Iowa, 700 tons, bridge.

State of Missouri, 600 tons, highway bridges.

WESTERN STATES

Reno, Nev., 149 tons, two bridges; bids opened.

Territory of Alaska, 700 tons, dredge hull.

State of Colorado, 400 tons, bridges, Denver & Rio Grande Western Railroad.

San Francisco, 1000 tons, bus terminal, Atchison, Topeka & Santa Fe Railway Co.

Los Angeles, 760 tons, three buildings for Aluminum Co. of America.

State of California, 400 tons, highway bridges over All American Canal, Specification 718, Bureau of Reclamation, Knob.

Los Angeles, 650 tons, race track.

Los Angeles, 700 tons, mill building.

Nicolaus, Cal., 700 tons, bridge.

Russ, Cal., 950 tons, bridges.

FABRICATED PLATES

AWARDS

New York, 900 tons, four oil barges, Socony-Vacuum Oil Co., to Kaw Point Motor Boat Co.

Charleston, W. Va., 520 tons, five deck sand barges, Pfaff & Smith Builders Supply Co., to Nashville Bridge Co.

Benton Harbor, Mich., 300 tons, water tank, to Pittsburgh-Des Moines Steel Co.

Mexico, 860 tons, water pipe, to United States Steel Products Co.

St. Louis, 800 tons, barges for United States Engineers, to Dubuque Boat & Boiler Works.

St. Louis, 300 tons, plate girders for Missouri Pacific Railway Co., to Bethlehem Steel Co.

NEW PROJECTS

Barberton, Ohio, 335 tons, 24-in. sewage line.

Los Angeles, 83,600 ft. of 36 to 69-in. pipe; bids soon.

SHEET PILING

AWARDS

Clinton, Iowa, 2200 tons, dam across Mississippi River, to Inland Steel Co.

Presses and Sheet Metal Machinery

(CONTINUED FROM PAGE 51)

A brief outline of the history of a typical New England concern may be cited. In 1868, the die and punch method of cold-drawing seamless cups and ferrules from sheet metal was patented by J. H. Cole, of Millbury, Mass., and the manufacture of steel ferrules for canes and tool handles was started at the corner of Union and Foster Streets, Worcester, Mass. In 1871 this business was bought by John L. Parker. In 1880, one of the pioneer tool makers, John Bennett, organized the Worcester Ferrule Co. with two other men, by the name of Converse and Matthews, as an outgrowth of the Parker business. This plant increased in size until 60 presses were needed for stamped stove trimmings, fittings for bicycle frames, and ball bearing cups. In 1904 the business was purchased by the Worcester Pressed Steel Co. and incorporated. Today this is one of the best known contract concerns in the East, and in a handsome, modern building, the president, John W. Higgins, has set up a very interesting museum of pressed metal products, well worth visiting.

Included in a partial list of products turned out last year by another New England contract manufacturer are parts for hair-curlers, deep-well pumps, textile machinery, postage stamp affixers, locks, clocks, radios, shoe-plates, ball bearings, dairy machinery, auto heaters, bicycles, vending machines, auto horns, electrical appliances, wrenches, vacuum cleaners, phonographs, typewriters, labeling machines, loose-leaf systems, steel gas containers, aircraft equipment and surgical appliances.

A New England industrial manufacturer is now making repeating and automatic shotguns with receivers fashioned from a single sheet of heavy steel, formed, bent double and welded. Heretofore machined forgings were the only source for this essential part of a gun. Today the power press and modern welding procedures give results fully equal to that previously secured in the highest grade of shotguns, at a fraction of the former cost.

A New York State equipment manufacturer has developed a method of making lacquered metal compete on equal terms with plastics in the flexible tube-container field. By a completely automatic process the original single shell screw-cap is combined with an outside shell or cover drawn from lacquered tin and closed over the screw cap with a lining of cork, of cork and foil, or of cardboard, cork and foil between. Although the cost of the new cap is double that of the original, it is slightly less than the plastic counterpart which was about to be adopted because of its "modern" appearance. This same equipment manufacturer has successfully installed a variable speed transmission drive on small blanking presses to accommodate quick production changes, and has made genuine contributions to the art of clutch design with a new instantaneous multiple disk friction clutch which is capable of very high speed operation without jolt or jar.

In Brooklyn, Bliss is still out in the forefront. Much of their attention has been turned lately to automatic can-making machinery. Not only the more familiar cylindrical food-tins, but parallel pipedons and truncated pyramids for packaging large volumes of bulk materials, can be made completely and without the "touch of human hands" on these monster robots. An odd sidelight in this connection is the Bliss can-testing machine shown in Fig. 19 which fills each can with air under pressure and automatically rejects any which show a leak. Cans are fed into the tester, filled, tested, revolved around the drum, and discharged automatically at the rate of 300 per min.

Bliss likewise has been adapting a variable speed drive transmission with built-in motor to small presses to provide greater adaptability. This is shown in Fig. 20 where the Reeves transmission is carried on the back of the inclinable press as the Old Man of the Sea was carried on Sinbad's back.

To Bliss also is credited a very recent development in the strip steel mill. Fig. 21 illustrates a new four-high mill with anti-friction backing up rolls of large diameter in proportion to their width, and very small working rolls to take a heavy bite on the metal in one pass.

Passing over to Philadelphia, it should be noted that among recent Baldwin-Southwark achievements is a portable testing machine for testing the strength of sheet metal welds. This equipment has been made in portable form so that it may be taken around the shop to test samples at frequent intervals as a check on each welder, to see that he is doing a satisfactory job. Samples of each job are cut out, put on the tester, and judgment passed immediately. The equipment is shown in Fig. 22.

One very interesting item of progress in the pressed metal industry in 1936 is the establishment of its first apprenticeship school, by Bliss in Brooklyn.

The beginning of this school carries the mind back to those early 19th century all-around mechanics who started the transformation of a hand industry into a mechanized one. Those men, who could take any reasonable mechanical idea (and some that seemed not so reasonable) and, by hook or by crook, make it work, were products of the early apprentice system. The industry, of course, followed the trend of progress toward specialization. The fact that pressed metal processes contribute in greater or less degree to almost every other industry has forced pressed metal equipment manufacturers to maintain a highly informal but quite efficient apprentice system which has developed well-rounded engineers and mechanics.

However, the establishment of an engineering school wholly devoted to this industry marks an epochal development. Perhaps in time the mechanical engineering fraternity will confer upon its implements the dignity of full membership in the class known as "machine tools." In any event, the progress indicated by this educational step will be watched with interest.

The Mid-Western Situation

West of the Alleghenies high speed mass production tends to give way in the pressed metal industry to the fairly large scale production of large size items, although mass production methods

(CONTINUED ON PAGE 106)

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Automotive strike is having slightly adverse effect on business at Detroit and Cleveland.

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. . . Hold-ups on machinery for motor plants may aid delivery situation.

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. . . December business in heavy volume; January probably will show a decline.

Detroit

ALTHOUGH inquiries continue for production machinery, the recent strike situation in General Motors plants and the threat of strikes elsewhere has introduced a note of decided uncertainty in the machinery market. General Motors obviously has held up on all new commitments for machine tools and, although stop orders have not been issued on machinery now being built, it is doubtful that delivery will be accepted on such equipment until the plants are reopened. Other car builders are proceeding with purchases of fill-in equipment to balance the lines, but decisions on major projects for the coming year have been held up indefinitely. Ford Motor Co. continues to be the most active buyer in this district at the present time. To some extent, the present situation will help relieve the long-term delivery schedules of many machinery builders, but as soon as the labor atmosphere is cleared, it is expected that purchases will be greatly accelerated. Increase in labor rates is going to enable machinery manufacturers to demonstrate more readily savings in replacement of obsolete equipment.

Chicago

YEAR-END orders climbed high wherever Jan. 1 price advances had been announced. There was a veritable flood of radial drill orders which pushed deliveries back to late May and June. New price advances are being announced, and the entire machine tool field will soon be at a higher level. December was a record month for some dealers, and January holds much promise unless higher prices and strikes check sales and inquiries. Effects of strikes are not yet serious in this area, though some hold-up orders are at hand. The Illinois Central has ordered a lathe and a drill press. The Santa Fe has added to its list a wheel press, an all geared drill, a planer and a 28-in. sliding head drill.

Cincinnati

ORDERS for lathes and milling and grinding equipment are brisk and drilling machinery tends to be more active. Heavy tools are moving conservatively, and the market tone is bright. Here and there, however, members of the trade express misgivings as to the future in the light of labor difficulties in the automotive field. So far, this has had no discernible effect but if the strike is prolonged, there will be a definite reaction. Delivery problems are still paramount, and users are requesting shipment as promptly as possible. Plants are operating at about 75 per cent of capacity, an increase over last month, but this still is not sufficient to make deliveries as rapidly as users demand.

Cleveland

A LULL in machine tool sales and inquiry is in evidence following the heavy rush of business before the Jan. 1 price advance. The strike in the automotive industry also is having a retarding effect on the volume of business. Makers of automobile parts have deferred the placing of orders that had been pending until the strike situation is cleared up. The slackening in business, if it continues any length of time, will enable some manufacturers to catch up a little on present long-deferred deliveries. The Westinghouse Electric & Mfg. Co. is inquiring for two lathes and two drilling machines for its plant for making small motors in Lima, Ohio.

Pittsburgh

BUSINESS placed in December was the largest in volume since war days. All customers were in a hurry to place their orders on the books before the end of the year. The rapid tempo both in orders and inquiries which took place in the last quarter carried over to some extent into the new year. In the past week, however, the rate of new business has slowed up some compared with recent activity. By no means has there been a sharp drop off but rather a "breathing spell." It is too early to determine the probable extent of business in the first quarter, but brokers are optimistic concerning the outcome.

New York

AFTER a December which promises to be one of the biggest months since the war in some machine tool offices, sellers here are now trying to resume their normal routine. They are meeting with little success, however, due to the unrelenting pressure from buyers for speedier deliveries, and a steady stream of new orders, despite the higher price levels now in effect on nearly all lines. Companies whose prices were not advanced prior to the first of the year are expected to make announcements soon. A great deal of the current buying seems to be for expansion purposes, very little replacement purchasing being reported. It is still quite difficult to secure good second-hand machines, and auctions and tool sales are consequently being regarded with interest.

Electric Refrigerator Sales Over 2,000,000

SALES of electric refrigerators in 1936 reached a new high mark of 2,037,746, according to estimates compiled by the Temperature Research Foundation of Kelvinator Corp., New York.

This figure represents an increase of 30 per cent over the 1,567,000 electric refrigerators sold in 1935. The 1936 sales bring the total number of electric refrigerators in use in the United States to 9,287,746.

At the end of 1935, there were 13,954,354 homes with electrical wiring that were without electric refrigerators. Since an increased percentage of 1936 sales were replacement sales due to scientific advances which rendered many of the refrigerators in service obsolete, Kelvinator's Foundation estimates that there are still at least 12,000,000 homes in the United States that are wired for electricity but that do not, as yet, possess an electric refrigerator.

Worthington Pump & Machinery Corp., Harrison, N. J., reports that it has entered the new year with the largest backlog of unfilled orders since 1930.

(CONTINUED FROM PAGE 104)

are variously in use also. The way toward larger work has been led, of course, by the automotive field. All-steel tops for motor cars, and the deep drawing of fenders (the new Buick front fender is one of the deepest draw heavy operations as yet tackled) are "tops" along this line. See Fig. 23 for an illustration of the General Machinery Corporation's triple-action presses for this kind of work. All the gearing, shafts, flywheel, clutch, brake and motor are in a pit, below the factory floor, readily accessible while the press is in production. Adjustments and servicing are made from the pit. The beds of these presses measure 100 inches by 180 inches, and they weigh over 500 tons each. Aluminum alloy aircraft parts, and the production of lightweight alloy parts for streamlined rail transportation units have opened up entirely new fields of endeavor. And, of course, as in the East, there are numerous contract stamping concerns that handle small high speed items such as were originally produced in the East.

Chicago, Detroit and Toledo are the main centers of activity, although interesting things are also being done in other localities. Among equipment manufacturers the Hamilton presses of General Machinery Corp., the Consolidated, Toledo and Bliss presses of E. W. Bliss Co. and the Fastraverse hydraulics of Hydraulic Press Mfg. Co. appear to be leaders. The last-named has become very popular in the plastics molding field, as well as for the straightening of heavy malleable castings, the manufacture of imitation leather products and various parts for electric refrigerators, because of the fine adjustability of stroke possible in the modern hydraulic press, and the length of dwell of hydraulically pressed dies.

Motion picture projectors and cameras of all types are today largely made up of pressed metal parts, some of which are made by the manufacturer himself, while others are supplied to him by contract stamping concerns. Industrial trucks, tractors and trailers use many pressed metal items, among which may be listed pressed metal castet wheels, some with tiny pneumatic tires. The disk-type pneumatic tire wheel for automobiles is a pressed metal development of growing importance. Office equipment, from metal desks and chairs to files, typewriters, adding machines and tabulating equipment, is almost entirely dependent upon pressed metal parts. Dairy machinery, laundry machinery, the food-packing and beverage industries call upon the pressed metal industry to a greater extent every day. Luggage hardware is almost entirely made of pressed metal today. And the great rubber industry could not function at all without adaptations of pressed metal technique. To a lesser, but still important degree, the same technique applies to the ceramics industry, to glass making, the brick making and to the manufacture of cellulose products. In fact, it is difficult to name a dozen industries of importance today in which the methods and equipment of pressed metal have not found successful and necessary applications.

Art in Industry

Of late years there has been a pronounced trend to "modernize" the appearance of both products and equipment. This was first apparent in commodities sold to the ultimate consumer. Package design has become almost a fetish, and the results are seen in thousands of cardboard, metal and glass containers now on display in the retail shops of the land. Pressed metal machinery, or adaptations of such equipment, have made these new "art" packages possible in most cases.

But the movement did not stop there. Machines with which the consuming public comes into direct contact have been modernized. Vending machines, office machines, scales, mechanical refrigerators, oil-burning furnaces, air-conditioning equipment — all have gone modern, and once more pressed metal machinery has been called into play to help effect the transformation.

Now the movement has definitely reached capital goods. Everywhere in industrial plants one sees its effect in the newer designs of machinery. The modern hydraulic press led the way in the pressed metal field, as has been shown by many illustrations in this article. But the newer mechanical presses distinctly reveal the trend also.

How much of this trend may be credited to pure esthetics and how much to the exercise of plain common sense in the economic utilization of high cost, finer quality materials, it would be difficult to say. Probably both factors enter into the situation equally. Certain it is that modern pressed metal equipment, coincident with the smoothing up of design, has in the past year attained a greater speed of operation, more accuracy in production, and turns out product at a lower overall cost, all with a substantial increase of the factor of safety in the machine itself. With such results, who can say that "art in industry" has not come into its proper place?

Dynamite Removes Blast Furnace Scab

THE removal of a "scab" or fused deposit 8 ft. thick and 12 to 15 ft. long from the inner lining of a blast furnace by blasting with dynamite, probably the first time this was ever attempted, was successfully accomplished recently at the Sloss Sheffield Steel & Iron Co. plant at North Birmingham, Ala. With the furnace charged and the materials burning, the scab was removed without the necessity of shutting down the furnace. The work was done under the direction of a field man of E. I. du Pont de Nemours & Co.

Holes 3 in. in diameter spaced 4 ft. apart in rows which were 4 ft. apart were burned through the steel jacket. In order to permit plugging the holes, short lengths of 3-in. threaded pipe were electrically welded to the jacket. Holes 5 ft. deep were then drilled through the brick lining into the scab. The holes were enlarged slightly by forcing a 1-in. pipe in and out in the holes, so that the dynamite charge could be placed in as short a time as possible.

As the furnace was hot, the charge had to be fired as quickly as possible. For this reason, all firing connections were made before the charges were placed in the holes. The "scab" was successfully removed without damage to the furnace beyond the drill holes through the steel jacket and the brick lining.

PLANT EXPANSION AND EQUIPMENT BUYING

. . . American Can Co., New York, will take bids soon for additions to its plant at Houston, Tex., costing $600,000 with equipment.

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. . . E. I. duPont de Nemours & Co., Ampthill, Va., has let contract for mill additions to cost over $500,000 including equipment.

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. . . Dow Chemical Co., Midland, Mich., plans an expenditure this year of about $1,000,000 for plant expansion and improvements.

NORTH ATLANTIC

Corn Products Refining Co., 17 Battery Place, New York, has plans for multi-story additions to plant at Pekin, Ill., for a corn sugar refinery. Cost close to $2,000,000 with machinery. J. W. Power is resident manager at Pekin.

American Can Co., 230 Park Avenue, New York, will take bids soon on general contract for one-story additions to branch plant at Houston, Tex. Cost over $600,000 with equipment. Company also has plans for one-story addition to branch plant at Simcoe, Ont., and improvements in present units. Cost about $75,000 with equipment.

Coast Guard Headquarters, Washington, has low bid on general contract from Graves-Quinn Corp., Grand Central Terminal, New York, for new seaplane hangar, 120 x 120 ft., with shop and repair facilities, at Floyd Bennett Field, Long Island, at $399,800. A new seaplane base for Coast Guard station is being established at that location.

Truscon Laboratories, Inc., 155 East Forty-fourth Street, New York, manufacturer of enamels, paints, etc., with main plant in Detroit, a subsidiary of Truscon Steel Co., Youngstown, has leased space in building at Vernon Boulevard and Forty-fourth Drive, Long Island City, for factory branch, storage and distributing plant.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Jan. 25 for 120,000 ft. of cable and 119 reels (Circular 107).

Fiat Metal Mfg. Co., 1203 West Roscoe Street, Chicago, manufacturer of metal shower-bath compartments and kindred metal products, has leased one-story building at 2139 Borden Avenue, Long Island City, N. Y., for new Eastern branch plant.

United States Industrial Alcohol Co., 60 East Forty-second Street, New York, has let contract to Maryland Steel Products Co., 1001 North Calvert Street, Baltimore, for structural steel for two-story addition, 64 x 95 ft., to plant at Curtis Bay, Baltimore. Cost about $30,000 with equipment.

Central Foundry Co., 420 Lexington Avenue, New York, has leased property at 135th Street and Park Avenue, held by George H. Storm Co., lumber, last noted address, which will build one-story addition to existing building and remodel present structures. Cost over $40,000. First noted company will occupy primarily for storage and distribution.

Sonotone Corp., 19 West Forty-fourth Street, New York, manufacturer of precision electrical devices, has purchased one-story building, about 25,000 sq. ft. floor space, on 7½-acre tract on Saw Mill River Road, Elmsford, N. Y., for new plant. Present works will be removed to new location in March and additional machinery installed.

Commanding Officer, Picatinny Arsenal, Dover, N. J., asks bids until Jan. 18 for 5180 lb. flat nailless steel strapping, ⅝-in. wide (Circular 402); until Jan. 29, 2525 galvanized steel carriage bolts (Circular 398).

Swift & Co., Union Stock Yards, Chicago, has leased about 18 acres at Port Newark, Newark, N. J., held by city, with frontage of 580 ft. on Port Newark Channel, for new Eastern branch plant. Initial units will be used for refinery division, primarily for production of edible oils, lards and kindred specialties. Present plants of company of this character at Chicago, Atlanta, Charlotte, N. C., and Jersey City will be removed to new location, where increased facilities will be provided and production concentrated. Cost over $750,000 with equipment. Following completion, other structures will be built for different production divisions, entire project to represent an ultimate investment of about $2,500,000. C. H. Brady is manager of company refinery division at 154 Ninth Street, Jersey City.

Air Reduction Sales Co., 60 East Forty-second Street, New York, has let general contract to Barney Ahlers Construction Co., 101 Park Avenue, for remodeling six-story plant, 80 x 200 ft., on Pacific Avenue, Jersey City, for expansion. Cost over $175,000 with equipment.

Asbury Graphite Mills, Inc., Asbury, N. J., manufacturer of graphite products, plans rebuilding part of plant recently destroyed by fire. Loss about $50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 19 for magnetic contactor switches (Schedule 9739) for Philadelphia Navy Yard; until Jan. 22, parts for gun mount adapter for airplane service (Schedule 900-416) for Philadelphia and San Diego yards.

SKF Industries, Inc., Front Street and Erie Avenue, Philadelphia, ball and roller bearings, transmission equipment, etc., has let general contract to Turner Construction Co., Architects' Building, for one-story addition. Cost close to $70,000 with equipment.

Philadelphia Electric Co., 1000 Chestnut Street, Philadelphia, has plans for extensions and improvements in local Schuylkill power plant. Cost about $5,000,000 with new primary and auxiliary equipment.

Ajax Flexible Coupling Co., Westfield, N. Y., manufacturer of light, medium, heavy-duty and special types of flexible couplings for direct connected machinery, has completed a factory addition providing increased manufacturing facilities.

NEW ENGLAND

Waterbury Button & Mfg. Co., Waterbury, Conn., manufacturer of metal specialties, metal toys, button machines, etc., has let general contract to Tremaglio Brothers, 1500 Highland Avenue, for one-story addition, 62 x 160 ft. Cost over $60,000 with equipment.

Boston Blacking & Chemical Co., Kendall Square, Cambridge, Mass., manufacturer of industrial chemicals, etc., has plans for one-story addition. Cost over $150,000 with equipment. Coolidge, Shepley, Bulfinch & Abbott, 1 Court Street, Boston, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 19 for five 1200-lb. platform scales, 14 1000-lb. and four 500-lb., portable weighing scales, and 25 240-lb. platform counter scales for Boston, Brooklyn, Sewall's Point and Mare Island navy yards (Schedule 9714).

Reliable Steel Drug Co., 521 Railroad Avenue, Bridgeport, Conn., has let general contract to Eagle Construction Co., 80 Bishop Avenue, for one-story addition. Cost about $30,000 with equipment.

Warren Telechron Co., Ashland, Mass., manufacturer of electric clocks and clock mechanisms, has plans for two-story and basement addition. Cost over $150,000 with equipment. Fay, Spofford & Thorndike, 44 School Street, Boston, are consulting engineers.

Central Maine Power Co., Augusta, Me., plans rebuilding high-tension power switching station at Fairfield, Me., recently destroyed by fire. Loss about $100,000 with equipment.

Wire Rope Corp. of America, 464 Congress Avenue, New Haven, Conn., has plans under way for additions. Leo F. Caproni, 742 Elm Street, is architect and engineer.

WASHINGTON DIST.

Standard Wholesale Phosphate Co., Mercantile Trust Building, Baltimore, manufacturer of acid products, commercial fertilizers, has let contract to American Bridge Co. for structural steel for three-story addition to plant at Curtis Bay, 110 x 450 ft. Cost close to $100,000 with equipment.

Contracting Officer, Office of Chief of Engineers, Munitions Building, Washington, asks bids until Jan. 20 for power plant equipment (Circular 20).

General Purchasing Officer, Panama Canal, Washington, asks bids until Jan. 18 for one 2400-lb. platform weighing scale, 12 240-lb. scoop platform scales, 48 bilge pumps, two steam pumps for boiler feeds, 48 engine lubricators, 4000 galvanized malleable iron or steel pipe clamps, one propeller fan with motor, steel eye bolts, sheet-brass, grommets, bronze wire cloth, galvanized steel poultry netting, 10,000 ft. bare silicon bronze wire and other equipment (Schedule 3216).

Rustless Iron & Steel Corp., 1001 Edison Highway, Baltimore, has authorized expansion and improvements in melting, cold finishing and other production divisions, with installation of additional equipment. Cost about $625,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until

Jan. 19 for about 22,000 galvanized steel buckets (Schedule 9707), electric soldering iron (Schedule 9720); until Jan. 26, two motor-driven upright drill presses (Schedule 9749) for Eastern and Western Navy Yards.

E. I. duPont de Nemours & Co., Rayon Division, Ampthill, Va., manufacturer of cellulose rayon products, has let structural steel contract for mill additions to Virginia Bridge Co., Roanoke, Va. Cost over $500,000 with equipment. Main offices are at 350 Fifth Avenue, New York.

Quartermaster, Marine Corp, Washington, asks bids until Jan. 19 for one electric grinder complete with pedestal and accessories (Schedule 449).

C. M. Kemp Mfg. Co., 405 East Oliver Street, Baltimore, is erecting a one-story building covering 7200 sq. ft. It will be used for its recently expanded welding department and for heavy machine assembly.

BUFFALO DISTRICT

Monarch Tank & Metal Fabricating Corp., 322 Ingham Avenue, Lackawanna, N. Y., has let general contract to Potter-DeWitt Corp., Pavilion, N. Y., for one-story fabricating plant at Perry, N. Y. Cost close to $50,000 with equipment.

Rochester Gas & Electric Corp., 89 East Avenue, Rochester, N. Y., plans expansion and improvements in local No. 3 steam-operated electric generating station, with installation of new 7500-kw. turbo-generator and accessories, high-pressure boiler, surface air coolers, pumping machinery and other equipment. Cost about $1,400,000. Company is also planning rural electrification program, comprising about 400 miles of transmission and distributing lines, with service facilities. Cost close to $500,000. Bond issue of $3,000,000 has been authorized, part of proceeds to be used for purposes noted.

Cuff Packing & Provision Co., Inc., 1061 William Street, Buffalo, meat packer, plans rebuilding part of plant recently destroyed by fire. Cost close to $45,000 with equipment.

SOUTH ATLANTIC

Georgia Power Co., Atlanta, Ga., plans extensions and improvements in plants and system to cost about $7,000,000, including expansion in steam-operated electric generating plant on Chattahoochee River, with installation of additional equipment; new power substations and switching stations at Bremen, Griffin and other points, and extensions in such stations at Augusta, Atlanta, Athens and Columbus. Over $1,000,000 of fund will be used for about 760 miles of new transmission and distributing lines for rural electrification, with service facilities; present transmission line from Atlanta to Macon will be rebuilt for increased service at cost of $275,000.

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for four 125-ft. steel radio range beacon towers at Naval Air Station, Pensacola, Fla. (Specifications 8342).

Jax Brewing Co., Sixteenth Street, Jacksonville, Fla., has let general contract to H. S. Baird, Atlantic National Bank Building, for extensions and improvements in brew house, mechanical-bottling department and other divisions. Additional equipment will be installed. Cost over $50,000.

SOUTHWEST

Standard Pipe & Plumbing Supply Co., 618 East Eighteenth Street, Kansas City, Mo., has leased for expansion two-story and basement building to be erected at Eighteenth and Holmes Streets by Dean & Co., owners. Cost over $40,000 with equipment.

Kansas City Industrial Land Co., Chrysler and Rickel Roads, Kansas City, Kan., has let general contract to Collins Construction Co., Davidson Building, Kansas City, Mo., for one-story buildings, totaling 100 x 565 ft., in Fairfax industrial district, Kansas City, Kans., to be occupied by Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, for branch assembling works for trailers and semi-trailers. Cost over $250,000 with equipment. Charles E. Keyser, 609 Minnesota Avenue, Kansas City, Kan., is architect.

Killark Electric Mfg. Co., 3940 Easton Avenue, St. Louis, manufacturer of electric conduits, fuses, fittings, etc., has let general contract to Hercules Contracting Co., 7807 Forsythe Street, Clayton, Mo., for one-story addition, 140 x 160 ft. Cost over $80,000 with equipment. Harry I. Hellmuth, Florissant, Mo., is architect.

Board of Public Utilities, City Hall, Kansas City, Kan., Charles A. Lowder, secretary, asks bids on general contract until Jan. 20 for two, three and six-story addition to municipal electric power plant, 98 x 130 ft. Cost close to $350,000. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Gulf Portland Cement Co., Trinity Life Building, Houston, Tex., Harper Holt, president, is arranging for purchase of about three-acre-tract on Houston ship channel for new cement mill. Cost over $300,000 with machinery.

Pan-American Refining Corp., Texas City, Tex., has approved plans for expansion at local oil refinery, including new cracking unit and other processing machinery. Part of equipment will be furnished by M. W. Kellogg Co., 295 Broadway, New York. Cost over $500,000 with machinery.

SOUTH CENTRAL

Brown-Forman Distillery Co., 1908 Howard Street, Louisville, has let general contract to George H. Rommel Co., 958 Logan Street, for multi-story addition to local distillery for storage and distribution. Cost over $85,000 with equipment.

Falstaff Brewing Corp., 3684 Forest Park Boulevard, St. Louis, plans extensions and improvements in plant of National Brewing Co., 2600 Gravier Street, New Orleans, recently acquired, including brewing, mechanical-bottling and other equipment. Cost about $150,000 with machinery.

United States Engineer Office, Louisville, asks bids until Jan. 20 for parts for suction dredge pumps.

Board of Public Works, Knoxville, Tenn., plans installation of new pumping machinery and auxiliary equipment at waterworks pumping station on Williams Creek. Cost close to $175,000.

Kentucky Springs Distillery Co., 429 West Market Street, Louisville, plans early erection of new distillery unit at Fisherville, Ky. Cost close to $60,000 with equipment. Walter C. Wagner, Breslin Building, Louisville, is architect.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Jan. 18 for six draft tube gates for power plant at Pickwick Landing, Tenn.

New Orleans Public Service, Inc., 317 Baronne Street, New Orleans, plans extensions and improvements in steam-operated electric power plant on Market Street, including new 37,500-kva. turbo-generator and accessories, high-pressure boiler and auxiliary equipment. Cost about $2,500,000.

WESTERN PA. DIST.

H. J. Heinz Co., 1062 Progress Street, Pittsburgh, canner and packer of food products, will take bids soon on general contract for three-story and basement addition, 150 x 350 ft., to branch plant at Medina, N. Y. Cost over $125,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Aluminum Co. of America, Inc., Gulf Building, Pittsburgh, has plans for one-story addition to mill at Alcoa, Tenn. Cost over $150,000 with equipment. Structural steel contract has been let to Bethlehem Steel Co.

Pennsylvania Power Co., Youngstown, has acquired property at New Castle, Pa., for new steam-operated electric power plant. Project will include transmission lines for connection with main system of company for service in Beaver, Butler, Mercer and Lawrence counties, and other new distributing lines. Cost close to $2,500,000.

OHIO AND INDIANA

Reeves Mfg. Co., Dover, Ohio, manufacturer of sheet metal products, plans erection of several one-story operating units. Cost close to $500,000 with equipment.

Heller Brothers Co., Newcomerstown, Ohio, manufacturer of files, rasps, wrenches and kindred products, plans one-story addition, about 20,000 sq. ft. floor space. Cost close to $50,000 with equipment.

Cleveland Electric Illuminating Co., 75 Public Square, Cleveland, has pans for expansion and improvements in steam-operated electric generating plant at Ashtabula, Ohio, to include new 50,000-kw. turbo-generator and accessories, high-pressure boiler and auxiliary equipment. Cost about $1,500,000.

Automotive Die & Products Co., Cleveland, has leased building at 5345 St. Clair Avenue for new plant.

Brewing Corp. of America, Inc., East Ninety-third Street and Quincy Road, Cleveland, has let general contract to Sam W. Emerson Co., 1836 Euclid Avenue, for four-story and basement addition, 96 x 106 ft., for expansion in brewing and fermenting departments, storage and distribution. Cost about $100,000 with equipment. Ernest McGeorge, 1900 Euclid Avenue, is architect and engineer.

Twin Coach Co., Kent, Ohio, manufacturer of motor buses and trucks, parts, etc., has let general contract to F. E. Clemmer, 569 Merriman Road, Akron, Ohio, for one and two-story additions, 100 x 250 ft., and 40 x 65 ft., respectively. Cost over $150,000 with equipment. Giffels & Vallet, Inc., Marquette Building, Detroit, is architect and engineer. P. H. Brehm is general manager.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Jan. 18 for eight selector pressure valves (Circular 431); until Jan. 25 for starter assemblies (Circular 429).

V. E. Sprouse Co., Columbus, Ind., manufacturer of stamped and spun metal products, has leased building at 730 East Washington Street, Indianapolis, about 8000 sq. ft., for branch plant. V. E. Sprouse is head.

J. I. Holcomb Mfg. Co., 1543 Van Buren Street, Indianapolis, manufacturer of cleaning compounds and kindred products, chemicals, etc., has purchased three-story U-shaped factory, formerly Leedy Mfg. Co. plant, Palmer Street and Barth Avenue, about 62,000 sq. ft. floor space. Present works will be removed to new location early in February and increased capacity carried out.

Southern Ohio Welding Co., Cincinnati, recently organized by H. Rinck and A. Dennis, has established a plant at 1253 West Sixth Street.

MICHIGAN DISTRICT

National Electric Welding Machines Co., Bay City, Mich., manufacturer of electric welding machines and parts, has let general contract to Henry C. Weber Construction Co., Bay City, for one-story addition to double present capacity. Cost close to $45,000 with equipment.

Dow Chemical Co., Jefferson Avenue, Midland, Mich., manufacturer of heavy industrial chemicals, etc., will expend about $1,000,000 this year for plant expansion and improvements. Of this amount approximately $580,000 will be used for additions to chlorine and caustic soda manufacturing works to advance present output about 50 per cent; ethylene products plant will be expanded at cost of about $350,000 with equipment; foundry expansion and improvements for Dowmetal production will cost close to $100,000, while addition to carbon and chloride works will cost approximately $200,000. Company has begun extensions and improvements in power pant, costing $300,000, including expenditures now made.

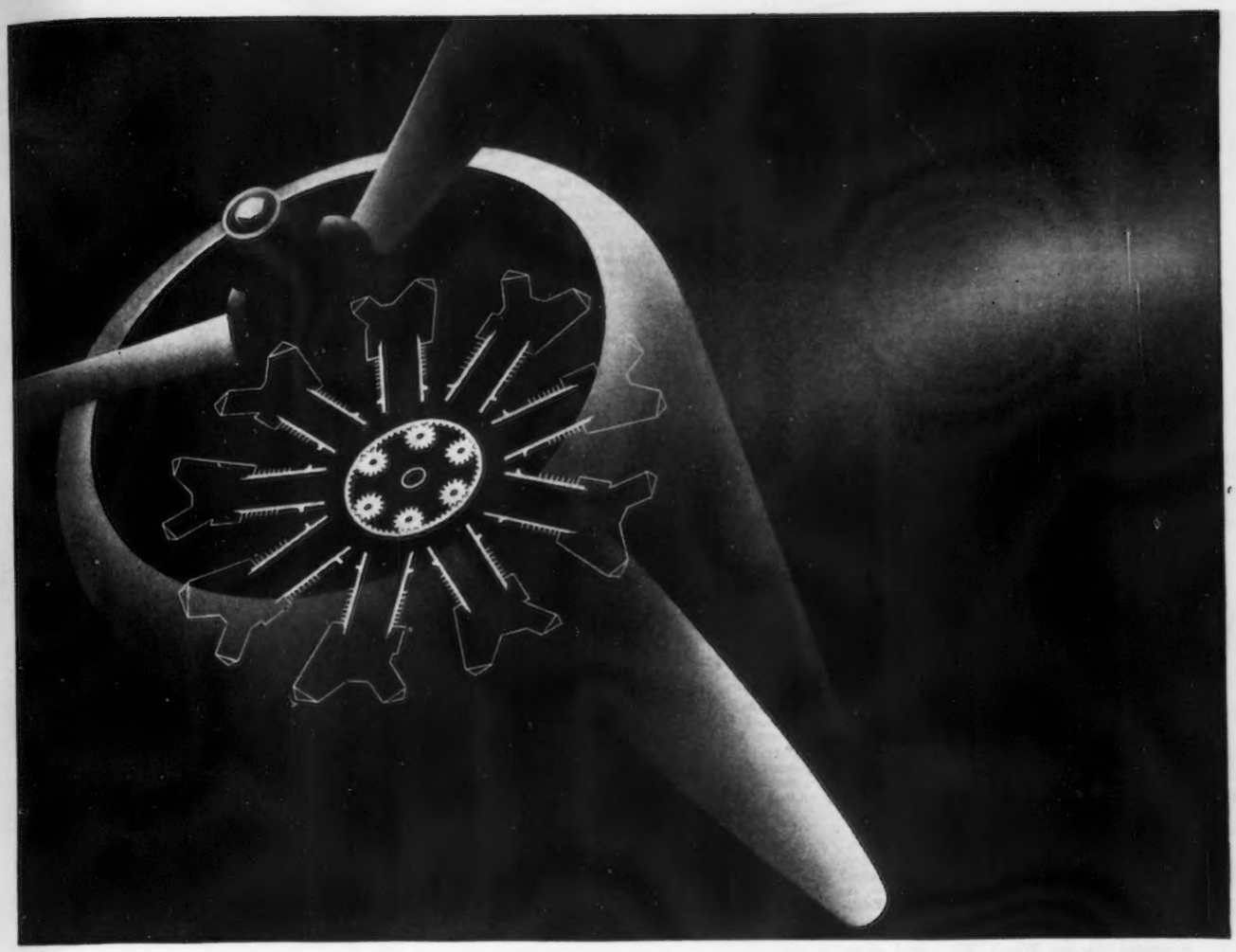
Board of Water and Light Commissioners, Lansing, Mich., is considering extensions and improvements in municipal electric power plant, including additional equipment. Cost close to $2,000,000. Claude Erickson, Lansing, is engineer in charge.

Hurd Lock Co., Almont, Mich., manufacturer of locks for automobiles, skid chains, etc., is planning early removal of plant to Adrian, Mich., where property has been acquired. Facilities will be provided for about 500 operatives.

Ford Motor Co., Dearborn, Mich., plans new one-story works at Vancouver, B. C., for assembling operations. Project will be carried out under direction of Ford Motor Co. of Canada, Ltd., Windsor, Ont. Cost about $450,000 with equipment.

MIDDLE WEST

Galvin Mfg. Corp., 847 West Harrison Street, Chicago, manufacturer of radio equipment for automobiles, parts, etc., has



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let general contract to Robert G. Regan Co., 228 North LaSalle Street, for new one-story plant on West Augusta Boulevard. Cost about $230,000 with equipment. Victor L. Charn, North Tower Court, is architect.

Cinch Mfg. Corp., 2335 West Van Buren Street, Chicago, manufacturer of automobile equipment and accessories, has let contract to Alfred D. Armi, 1335 South Austin Boulevard, for two-story addition, 70 x 125 ft. Cost about $60,000 with equipment. J. J. Novy, 2434 South Ridgeway Avenue, is architect.

Iowa Packing Co., East Eighteenth and Maury Streets, Des Moines, meat packer, has let general contract to Arthur H. Neumann & Brothers, Hubbell Building, for five-story and basement addition, 100 x 130 ft. Cost close to $300,000 with equipment.

Northern States Power Co., 15 South Fifth Street, Minneapolis, plans extensions and improvements in plants and system to cost about $8,100,000, in which amount appropriation is being made. Large part of fund will be used for expansion in steam-electric generating plant, including additional equipment. Transmission and distributing lines will be built for rural electrification, with service facilities.

Gopher Stamp & Die Co., Chicago Avenue and Custer Street, St. Paul, plans rebuilding part of plant recently destroyed by fire. Loss close to $50,000 with equipment.

St. Cloud Brewing Co., Eighth Avenue North and Sixth Street, St. Cloud, Minn., plans one-story and basement addition, 70 x 75 ft. Cost close to $45,000 with equipment. Louis C. Pinault, Lahr Building, is architect.

Zenith Radio Corp., 2020 West Austin Avenue, Chicago, has let general contract to James A. Adams, 201 North Wells Street, for two-story factory unit and improvements in present building. Cost about $100,000 with equipment. Frank D. Chase, Inc., 307 North Michigan Avenue, is architect and engineer.

United States Engineer Office, Fort Peck, Mont., asks bids until Jan. 18 for gate and globe valves (Circular 306).

Madison-Kipp Corp., Madison, Wis., manufacturer of mechanical lubricators, die-casting machines and other mechanical devices, has purchased from George A. Steinle, turret lathe manufacturer, Madison, old Four Lakes Ordnance shop at 2810 Atwood Avenue, built by Navy Department during World War, and since practically unused. Purchasing firm will recondition shop, which adjoins its plant, for extension of its own production. Project will require considerable new equipment.

Curt G. Joa, Inc., Manitowoc, Wis., manufacturer of special purpose machinery, has increased its capitalization from $25,000 to $50,000 in contemplation of enlarging plant and production. Definite plans are not yet formulated.

Wecho Electric Co., Waukesha, Wis., manufacturer of low voltage electric controls, has transferred shop and office to Fond du Lac, Wis., where it has leased quarters at 128-134 North Main Street.

Enterprise Tin Plating Works, Two Rivers, Wis., has placed general contract with Arthur Stueke Co., local builder, for new factory at 1207 Monroe Street. Architect is Sylvester Schmitt, Two Rivers.

Marathon Paper Mills Co., Wausau, Wis., is considering plans for enlarging its paper converting plant at Menasha, Wis. Cost of building and equipment may run as high as $300,000. D. C. Everest is general manager.

◀ PACIFIC COAST ▶

North American Aviation Co., Imperial Highway, Inglewood, Cal., manufacturer of airplanes and parts, is considering new plant at municipal airport, Los Angeles, for parts production and assembling, totaling close to 150,000 sq. ft. floor space. Cost over $250,000 with equipment.

California Cotton Oil Corp., 2301 East Fifty-second Street, Vernon, Los Angeles, plans early rebuilding of part of mill recently destroyed by fire. Loss close to $200,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 22 for two motor-driven engine lathes (Schedule 9743), two electric-generating sets, gasoline engine-driven (Schedule 9744), for San Pedro, Los Angeles Naval Station; spare parts for airplanes (Schedules 900-379 and 900-422); until Jan. 26, one motor-driven engine lathe (Schedule 9752), one motor-driven head punch and shear (Schedule 9748) for San Diego Naval Air Station; two motor-driven brake-forming machines (Schedule 9754) for San Pedro station; until Jan. 19, motor-driven portable blowers (Schedule 9710) for Puget Sound yard; until Jan. 22, two double drum winches and spare parts (Schedule 9736) for Mare Island yard.

Associated Oil Co., 79 New Montgomery Street, San Francisco, has approved plans for expansion and improvements in oil refinery at Avon, Cal., including new cracking unit for gasoline production and other equipment. Cost close to $1,300,000 with machinery. Part of equipment will be furnished by Alco Products, Inc., Dunkirk, N. Y.

Bureau of Reclamation, Denver, asks bids until Jan. 22 for one emergency bulkhead gate, gate guides, gate slot-cover and auxiliary equipment; needle valve outlets and trash racks sections and auxiliary parts for slide-gate outlets, Bartless Dam, Salt River Project, Ariz. (Specifications 868-D).

◀ FOREIGN ▶

Metal Box Co., Ltd., London, England, manufacturer of tin cans and boxes and other metal containers, has approved plans for new plant in South Wales district. Expansion and improvements will be carried out at several existing plants, including installation of equipment. Company recently arranged for additional capital to total about $1,500,000 for expansion noted.

Provincial Government of North District of Lower California, Ensenada, Lower California, plans new pulp and paper mill at Mexicali, Lower California, for production of high-grade paper stocks, using local fibers for raw material for pulp manufacture. Plant will include power house, machine shop and other mechanical departments. Cost over $350,000 with machinery. Application has been made to Federal Government of Mexico, Mexico, D.F., for financing for project.

Gyproc Products, Ltd., Clydeside, Scotland, manufacturer of plasterboard products, a subsidiary of Distillers Co., Ltd., same place, has plans for new one-story plant in Shieldhall Estate district, where property has been acquired. Cost over $150,000 with equipment.

Machinery Exports Gain in November

EXPORTS of industrial machinery from the United States during November were valued at $12,725,356, a slight increase compared with November, 1935, exports valued at $12,619,169, according to the Machinery Division of the Department of Commerce.

The increase was distributed generally over the various machinery lines, however, the more noticeable advance taking place in the sales of mining, well, and pumping machinery. Exports in this group amounted to $2,859,878 compared with $2,464,969 during November, 1935, the chief increase being in the exports of petroleum and gas well drilling machinery, and other petroleum and refining machinery, which combined amounted to $1,639,085 against $1,236,802 in November, 1935. Foreign shipments declined in some particular classes of pumps, but total pump shipments, valued at $379,695, slightly exceeded the November, 1935, exports valued at $353,816.

Foreign shipments of power-generating machinery increased from $655,668 in November, 1935, to $683,012 in November of this year.

Overseas consignments of construction and conveying machinery decreased slightly, falling from $763,778 in November, 1935, to $711,689 in November, 1936.

While there was a noticeable decrease in the exports of power-driven metal-working machinery, the November, 1936, value totaling $3,785,013 compared with $3,923,375 exported in November, 1935, exports of lathes advanced to $442,898 from $340,464; sheet and plate metal-working machines to $410,930 from $193,127; and forging machinery to $174,388 from $133,787, statistics show.

The 11 months' total value for industrial machinery exports from the United States was $143,696,712 compared with $110,298,231 during the corresponding period of last year, according to the Commerce Department.

. . TRADE NOTES . .

Effective Jan. 1, 1937, business previously conducted under the name of Steel Plate Construction Co., Portland, Ore., will be continued by the firm, McCulloch & Sons. Management is unchanged.

Luria Brothers & Co., Inc., Woolworth Building, New York, has formed the Luria Steel & Trading Corp. to specialize in export and import.

Worthington Pump & Machinery Corp., Harrison, N. J., has absorbed its subsidiary, Worthington Co., Inc.

Foote Brothers Gears & Machine Corp., 5301 South Western Boulevard, Chicago, has completed a plant addition which adds 5300 sq. ft. of floor space to assembly and testing departments.

Wheelco Instruments Co., 1112 to 1114 Milwaukee Avenue, Chicago, has opened a Detroit office at 6432 Cass Avenue, in charge of James A. Harrison.

Allis-Chalmers Mfg. Co., Milwaukee, will operate its subsidiary, Condit Electrical Mfg. Corp., 1344 Hyde Park Avenue, Boston, as a company unit under the name of Allis-Chalmers Mfg. Co.—Condit Works.

Hilton Steel Co., Warren, Ohio, has purchased factory and land it now occupies from Wick Security Co., Warren, and contemplates rebuilding and improving this property.

George J. Kirkgasser & Co., 400 North Michigan Avenue, Chicago, has changed name to Kirkgasser-Drew, Inc.

Crawford Oven Co., New Haven, Conn., will henceforth be known as the Crawford Oven Division of the American Machine & Foundry Co., New York. Personnel will continue unchanged.